UNDP/ADAPTATION FUND PROJECT
"ADDRESSING CLIMATE CHANGE RISKS TO FARMING SYSTEMS IN TURKMENISTAN AT NATIONAL AND COMMUNITY LEVEL "

TERMINAL EVALUATION REPORT

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Project Data Sheet

UNDP Project ID:	00059797
ATLAS Project ID:	00074953
Country	Turkmenistan
Region	Eastern Europe and Central Asia (ECA)
Focus Area	Ashgabat
Executing Agency	The State Committee of Turkmenistan on Environment Protection and Land resources
Other partners	Other government ministries relevant for water management; Pilot project sites
ProDoc signed (start)	December 8, 2011
Planned closing date	September 2016
Revised closing date	September 2017
Project financing	Project Cost in cash at commencement: US$ 2,793,105 (AF- US$ 2,700,000; UNDP-US$ 93,105)
Evaluation time frame	May- June 2017
Evaluation report date	Draft June 21, 2017, final due July 14, 2017
Evaluation team	Lilit V. Melikyan

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All the omissions are those of the author of the report.

ACRONYMS AND ABBREVIATIONS

AF	Adaptation Fund
ALM	Adaptation Learning Mechanism
AWP	Annual Work Plan
ADB	Asian Development Bank
CAF	Cancun Adaptation Framework
CBM	Cubic meters
CDR	Combined Delivery Report
CO	Country Office
CP	Country Programme
CRL	"Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (2016-2021)" UNDP Turkmenistan project funded by SCCF, Government of Turkmenistan and UNDP
CPAP	Country Programme Action Plan
PD	Country Programme Document
CRM	Climate Risk Management project
CSO	Civil society organization
DAC	Development Assistance Committee
D/U	Daikhan Union
EU	European Union
EA	Executing Agency
EBRD	European Bank for reconstruction and Development
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIZ	German Agency for International Cooperation
GoT	Government of Turkmenistan
HA	Hectares
ICTA	International Chief Technical Advisor
IA	Implementing Agency
I&FF	Investment and Financial Flows
IFI	International Financial Institution
KM	Kilometres
M&E	Monitoring and evaluation
MOU	Memorandum of Understanding
MDG	Millennium Development Goal
MSP	Medium-sized Project
MTE	Mid-term Evaluation
MIE	Multilateral Implementing Entity
MIEMWE	Ministry of Water Economy
NAPA	National Adaptation Programme of Action
NAP	National Adaptation Plan
NEX	National Execution
NGO	Non-Governmental Organization
NIE	National Implementing Entity
NPD	National Project Director
NPM	National Project Manager
OECD	Organization for Economic Co-operation and Development
PID	Project Initiation Document
PIF	Project Identification Form
PIU	Project Implementation Unit
PPR	Project Progress Report
PBM	Project Board Meeting
ProDoc	Project Document
RBM	Results-based Management
RTA	Regional Technical Advisor
SLM	Sustainable Land Management
SCCF	Special Climate Change Fund
SDG	Sustainable Development Goal
TOR	Terms of Reference
TE	Terminal Evaluation
UNFCCC	United Nations Framework Convention on Climate Change
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USD	United States dollars
VCA	Vulnerability and Capacity Assessment
WUA	Water User Association
WUG	Water User Group
WB	World Bank
WRM	Water Resources Management

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EXECUTIVE SUMMARY

The Turkmenistan Farming Systems Adaptation project was funded by the Adaptation Fund (AF) with a grant amount of 2.70 million United States dollars (US$) (not including US$0.23 in project implementation fees), and US$0.00 planned co-financing. The United Nations Development Programme (UNDP) is the Multilateral Implementing Entity (MIE), with the State Committee on Environmental Protection and Land Resources as the National Executing Entity. The project had an originally planned five-year implementation period, from September 2011 to September 2016 (although the Project Document was signed in December 2011) which was extended to September 2017.

Table 1 Project Summary Data

Project Title:	*Addressing climate change risks to farming systems in Turkmenistan at national & community level*			
UNDP PIMS ID:	4450		*At endorsement (US$)*	*At completion (US$)*
UNDP ATLAS Project ID:	00074953 / TKM10	AF financing:	US$2,700,000	US$2,700,000
Country:	Turkmenistan	IA/EA own:	US$0	US$28,000
Region:	Eastern Europe and Central Asia	Government	US$0	US$360,000
Focal Area:	Climate Change Adaptation	Other:	US$0	US$279,000
Sectors:	Agriculture, Water Management	Total co-financing:	US$0	US$667,000
Executing Agency:	Ministry of Nature Protection	Total Project Grant Cost:	US$2,700,000	US$4,034.000 +US$93,105 UNDP TRAC Funds=US$4,127,105.00
Other Partners Involved:	UNOPS, other government ministries relevant for water management		ProDoc Signature	December 08, 2011

The ***project objective,*** according to the Project Document is to achieve greater water efficiency and productivity under climate change induced aridification by strengthening water management practices at national and local levels in response to climate change induced water scarcity risks to local farming systems in Turkmenistan.

The project document, highlights that: "*Water availability and supply are likely to suffer from increasing shortages due to elevated temperatures, overall climate aridification and competition for water arising from regional trans-boundary water issues. Turkmenistan's inherent aridity and reliance on agriculture as a source of both income and food renders the country particularly vulnerable to these climate change impacts*." The specific projected climate impacts that may affect the agriculture sector include:

- An increase in average annual temperature of between 4.2 and 6.1°C by 2050, which will include an increase in the number of extremely hot days (i.e. days over 40°C);
- A reduction in annual average rainfall between 15 and 56 percent by 2050;
- An increase in average regional evaporation rates of 48 percent by 2050;
- An increase in the frequency and intensity of drought and flood spells;
- A 15 percent reduction in flow rates for the Amu Darya and 30 percent for other river systems;
- A 10 percent reduction in run off rates in terms of surface water collected in national storage and distribution systems, increasing to 30-40 percent during vegetation periods;
- Total annual water resources decreasing by 5.5 billion m^3 (or 20 percent) by 2050, etc.

As outlined in the project summary for the AF, the project seeks to strengthen water management practices and legislation at the national and local levels to support the adoption of high efficiency irrigation techniques. This was considered important for local communities in that water is diverted

away from private sector agriculture and horticulture towards strategic state crops. Economic evidence was supposed to be collected to support water and agriculture modelling activities undertaken separately by the Ministries of Water Management and Agriculture. The project, based on economic evidence and international experience, was supposed to help with reframing of water legislation to include climate change considerations, and help introduce regulations that support progressive water pricing and the communal management of water delivery services. It was expected that the project will generate evidence on costs and benefits and socioeconomic impact of the adaptation measures (drip irrigation, water points, saksaul planting, and irrigation canal maintenance, etc.), introduced by the project, as well as community level approaches (including water user associations (WUAs), the establishment of which was supposed to be facilitated by the project). The project chose three pilot areas: Nohur (mountainous), Karakum (desert) and Sakarchaga (oasis), which are the main three agro-ecological zones of the country. The lessons from these regional pilots were expected to be used not only to inform the legislative reform process relating to land management and water use/pricing, but also in the development of larger scale communal management systems and their integration into the government's social development and poverty alleviation strategies. The capacity of the WUAs was supposed to be strengthened with training and support provided to their work, including with funds provided for WUA-led community adaptation plans and concrete investments in water management systems and infrastructure. The project objective was planned to be achieved through three main components:

- ***Component 1: Policy and Institutional Capacity Strengthening;***
- ***Component 2: Community Based Adaptation Initiatives;*** and
- ***Component 3: Communal Management Systems for Water Delivery***

The project results' framework, with expected indicators and targets (included as section III.D of the project document) is the primary element for assessing project results (progress toward the expected outcomes and objective) and effectiveness. The evaluation used triangulation of findings from document review, interviews and observations during the site visit as the main evaluation methodology supported by contribution analysis.

SUMMARY OF CONCLUSIONS

The project is considered ***relevant*** to Turkmenistan's national climate adaptation needs and priorities, and highly relevant to the climate adaptation needs and priorities of the local communities in the three pilot regions of Nohur, Karakum, and Sakarchaga. The project objective is also relevant to the AF's strategic priorities, UNDP's strategic objectives for Turkmenistan, Sustainable Development Goals (SDGs), the Cancun Adaptation Framework under the UNFCCC and the Paris Climate Agreement. The project strategy and design is logical and cohesive, but is considered only ***moderately relevant***, as it is overly ambitious, with the strong interdependencies of the various components- the delivery of which depends largely on external factors.

The efficiency of the project is rated as ***satisfactory*****.** Due to problems with project start-up, following approval, the project was approximately 12-15 months behind the originally planned schedule by mid-point. The delay has not had significant negative effects on the project's ability to achieve its expected outcomes, because the on-the ground activities were rapidly brought up to speed. At the same time, there was a diversion from the planned proportions in the spending: there was overspending on physical adaptation infrastructure, international consultants and project management at the costs of less finances left to be available for Component 3, in particular on activities related to documenting lessons learnt and best practices and sharing. The fact that the revised Water Code was not adopted until 2016. had contributed to this, as the project management at the time wanted to register progress with the project while waiting for the adoption of the new Water Code, not being entirely sure that it will happen in the project lifetime, The engagement of more international consultants (not planned originally), while programmatically justified (bringing the cutting edge expertise and boosting the rigor in evidence base) but it happened too late in the project cycle (2016) affecting the project spending priorities in the planned budget, and meaning that the last rounds of the planned research is not possible in the framework of this project. The planned project management budget was exhausted already in 2016 as more people were hired to ensure the delivery of the expanded (over the planned scale) physical

adaptation infrastructure measures. However, the project has successfully countered the numerous challenges on its way however. The latter include: late start- due mostly to late registration; changes in the Government in 2106; changes in the project management (twice), etc. It has also displayed good adaptive management in (a) securing US$667,000 in co-financing, although no co-financing was officially committed at project approval; (b) finding an alternative to the planned WUA model in the form of the Water User Groups (WUGs), based on the *brigades* functioning within farmers (*daikhan)* associations, when it became clear that the draft of the Law on WUAs is not going to be adopted anytime soon; and (c) finding the ways to collect the socioeconomic data to assess the impact of the project despite the challenges. The project management arrangements are working overall well, and the project has applied an appropriate partnership approach, including excellent collaboration with the UNDP's regional Climate Risk Management (CRM) project, and with a number of other relevant projects undertaken by the current State Committee on Environmental Protection and Land Resources (formerly Ministry of Nature Protection).

The project results and overall progress toward the expected outcomes is considered ***satisfactory*****.** Following the initial slow project start-up, significant progress and results have been achieved to date (up to the point when the Terminal Evaluation was conducted). The project has a total of 16 indicators, and the project has already achieved 15 of them with the remaining one is concerning the fact that 3 key draft pieces of legislation (draft Law on WUAs, recommendations on the reform of irrigation water pricing and the suggested revisions to the Law on Daikhan Associations) developed by the experts of the project are still under review by the Government and their adoption is not expected in the immediate future. So, the reasons of the non-achievement of that indicator are external to the project. The Government has slowed down on the reform path of rural water and land management compared to the plans back in 2010, although there are already some signs that the reform processes are taking shape. In particular there, are increasingly more farmers taking land under long term lease (39 years) and the installation of water meters on irrigation network (a precondition for the reform of water pricing) is progressing well.

The key results produced as of June 2017 include:

- Multiple expert policy recommendation documents provided to the Government for considering as part of reforming rural water and land management. These include the drafts mentioned above but also the recommendations to the draft of the new Water Code. The adoption of the new Water Code (2016), to which the project contributed significantly, is one of the key successes of this project. The new Water Code includes articles that enable community-based management of water resources, by expanding the authority over management of the water resources to the water users' groups and associations. Among other rights, water users' groups become full-fledged participants of the agricultural sector who are able to perform irrigation works and be paid. The Code also stipulates administrative and operations' procedures to be put in place by the water users' groups and associations to ensure their operations and rights. Approximately 80 percent of the recommendations of the project were adopted. There were also important changes introduced to the Law on Pasture Management. Significant amount of work was done on the development of a proposal for a water delivery services there are some concerns that the proposal does not fully address some critical water management inefficiency drivers, such as pricing incentives and mechanisms at the farmer level;

- Completion of multiple on-the-ground water infrastructure improvement projects across the three pilot regions (see **Table 2**) with overall appropriate for the specifics of each of these agroecological zones adaptation measures. As mentioned, this list significantly surpasses the original plans. Many of the adaption measures are innovative, e.g.: methods to improve natural pastures; agrotechnical methods of phytomeliorative works on shifting sands; construction of small reservoirs in the mountains; using drip irrigation systems to improve the efficiency of irrigation water use; restoration of juniper forests in the Central Kopetdag; introduction of laser leveling of irrigated lands to increase crop yields; using the mountain slopes for growing grapes, fruit trees and vegetables; creation of pistachio gardens, etc. The project supported also traditional technologies for watering of desert pastures in the Central Karakum (sardobs for drinking and watering animals) and wells for watering

sheep and camels. The share of the innovative solutions could have been larger, with, for example, wells utilizing solar energy (was planned but the residents declined arguing that for the same cost they will have more of the traditional type), but the project chose not to divert from the principle of the adaption measures being demand driven. While there are quite convincing justifications behind the choice of some of adaptation measures that actually lead to using more water, there are some concerns related to potential maladaptation: they do have accompanying measures to counter this with water efficiency promoting initiatives;

- Completed community climate vulnerability assessment reports for the three pilot regions followed by a list of adaptation measures to be promoted in each in general (i.e. not only under this project);
- Numerous community-level capacity development activities related to establishing and operationalizing Water User Groups (WUG), including many training activities (***over 500 people trained)*** both in adaptation techniques and WUG management). The formation and the operation of the WUGs was supported by the development of WUG operation guides and manuals. This was followed by closer work with 8 WUGs, at last 6 of which are rather promising in terms of their sustainability prospects. These, in particular the ones in irrigated areas, operating on the water basin principle, could serve as prototypes of the future water-basin based WUAs when the reforms speed up (with water metering and adequate pricing in place and long-term land lease as well as private ownership becoming common). The 8 WUGs were supported also financially, with grant funds channeled through them for adaption measures. They also received some support towards the costs of renovating office spaces. Study tours were conducted for the local coordinators to Israel and Kazakhstan (the latter under the UNDP South-South Initiative)
- A study on *Socioeconomic impact of the adaptation measures* was completed in 2016 (ideally this should have covered 2017, which was planned but not done due to financial constraints in 2017). The results need to be shared with all relevant constituents country wide. Although not planned initially, in 2016 the project introduced modelling and training on FAO AquaCrop and USDA NRCS SURFACE methodologies: this work is also incomplete due to the same reasons.
- Concrete positive results through partnerships with other relevant projects include:
    - Synergies with the UNDP's regional Climate Risk Management (CRM) project;
    - Cooperation with the (then) Ministry of Water Resources for the reconstruction of the discharge drainage, financed by the state budget; and
    - Cooperation with the "Zakhmet" Farmers' *(daikhan*) Association in Sakarchaga, to introduce modern irrigation methods for winter wheat in 300 hectares (ha), financed by the association.

Table 2 Description of adaptation measures

Description of adaptation measures in Nohur	Quantity
Construction of dams	8
Repair of dams and springs	6
Reconstruction and replacement of the water pipe between the spring « Gozbash »* and a reservoir	3 km
Reinforced concrete basins for water storage	3
Drilling of a new wells	2
Reconstruction and repair of the existing drip irrigation system	20 ha
Design and construction of a drip irrigation system	47 ha
Afforestation of the catchment	10 ha
Local nursery and growing seedlings of local species of trees	0.5 ha
Production of organic-compost and bio-humus	15
Description of adaptation measures in Karakum	Quantity
Construction of a new wells	15
Repair of the existing wells	13
Construction of new sardobs	15
Repair of existing sardobs	4
Cleaning of takyrs and kaks	4
Sand dune fixation and afforestation	10 ha
Nursery/growing seedlings of local tree species	0.3 ha
. Description of adaptation measures in Sakarchaga	Quantity
Construction of water regulating devices	16
Repair of water regulating devices	2
Reconstruction and cleaning of on-farm open collectors	31,5 km
Construction of the new open collector	5 km
Rehabilitation of earlier used abandoned lands	50 ha
Laser Land leveling of irrigated lands	150 ha
Drip irrigation system	3-4 ha
Establishment of local nursery and growing seedlings of local species of trees	0.3 ha

Cooperation could have been sought also with the EU/GIZ regional project on transboundary water management in Central Asia, and in particular its country level component on promoting water basin management in Mary welayat, i.e. where one of the pilots (Sakarchaga) is located.

The project estimates that the total population benefitting from the implementation of this project amounts to more than 69,400, implying that the initial target of 62.000 people has been thus exceeded by 12 percent. This figure includes both direct and indirect beneficiaries (with the number of direct beneficiaries at over 35,420 compared to 32000 planned). During the implementation of adaptation measures representatives of local communities both men and women (60 and 40 percent respectively) actively participated. Importantly, women are also active member in the WUGs, including their management committees, especially in Sakarchaga.

The project also estimates that the water saving is achieved minimum at 10 percent (one study puts it at 20 percent) in the irrigated and oases zones contributing to around 20 percent increase in incomes.

Thus, AF resources made significant contribution to (a) reforming the legal basis of improved rural water management for climate change adaptation (with the significant contribution to the new Water Code); (b) promoting concrete adaptation measures- many of which are innovative, demonstrating their benefits with evidence; (c) achieving greater awareness of the local population in climate change induced risks for agriculture and possible adaptation measures and (c) the development of a prototype model to WUAs in the form of the WUGs. Taken together this is an important contribution to the improved local response mechanisms and resilience to drought induced shocks and long term aridification that results in greater water shortages in Turkmenistan. The effectiveness of the project thus far is considered ***satisfactory*** but it is not fully clear to what extent will the project contribute to more climate-resilient water management. Government institutions and the overall agricultural and water management system (including pricing structures and mechanisms) have a significant influence on the ability of communities to efficiently manage their water resources. The effectiveness of the project will ultimately depend on (a) the extent to which the project influences legislation, policy, and regulation development; (b) the extent to which true WUAs (in their textbook definition, rather than WUGs) become functioning and self-sustaining entities that can actually influence water use and management practices; and (c) the Government embarks on the reform agenda more forcefully and scales up the good practices. Plus, this rating is given provided (on the condition) that the lessons from field-level demonstration activities are documented and shared widely, beyond the pilot regions.

Table 3 Summary ratings table

Category	Rating
Progress Toward Results	
Project concept	Very relevant/HS
Project Design	MS
Relevance	*Relevant / S*
Progress Toward Outcomes	S
Results	*S*
Effectiveness	***S****
Overall effectiveness of project management	
Efficiency	***S***
Work Planning	MS
Finance and Co-finance	MS
M&E Systems	S
Risk Management	MS
Reporting	S
Management Arrangements	S
Quality of Execution support	S
Quality of Implementation, support Including UNDP's Role	S
Sustainability	
Overall Likelihood of Sustainability of Results	***ML/S***
Financial and Economic Risks	ML
Socio-political Risks	ML
Institutional Framework and Governance Risks	L
Environmental Risks	L

** Some aspects in terms of impact will depend on the course of the reform, however. "S" is given provided that the knowledge sharing is done widely*

The overall sustainability rating for the project is ***moderately likely*****.** The project has activities focused at different levels (field level vs. policy level), so sustainability potential of the different types of results varies. There do not appear to be critical risks to the sustainability of project direct results, i.e. to the viability of the provided adaptation measures, and even the WUGs (most of the 8 WUGs are likely to continue in some form, e.g. cooperatives, if not becoming part of the reform agenda-based WUAs). At the national policy level, if (a) the project succeeds in having all its amendments and revisions incorporated into water policy and legislation (correctly addressing water

pricing mechanisms); and (b) if the Government programs pick up the funding of the scaled- up implementation of the recommended adaptation measures, then it is expected that the results would be sustained. In fact, a number of these measures (like drip irrigation) are already in the government programs and so the first step is done.

LESSONS LEARNT

1. Changing the legislative basis to recognize climate impacts is a multi-year process, and dependent upon national timetables and processes. This has to be taken into account in the design of similar projects;
2. Water management approaches have to be carefully adapted to the local context. Project experience has shown, for example, that the WUG approach works differently in the three project pilot areas;
3. Longer term awareness raising is needed among the population to increase the appetite for innovative technologies and break the understandable inertia leading to preference of traditional technologies. It can be beneficial to prioritize awareness raising and education activities earlier in the project implementation period, to build community stakeholder buy-in and awareness for adaptation measures;
4. International best practice is important for agricultural systems and well worth to get due consideration at the project design stage;
5. Projects like this lend themselves very well to applying rigorous impact evaluation (with control groups) and such opportunities must be seized to be able to argue for the benefits with rigor that will stand scientific scrutiny;
6. UNDP and government partners need to prepare prior to final project approval for immediate ramp-up of human-resources and any necessary formal agreements or arrangements (such as registration of the project as a foreign assistance project). It is also important to acknowledge that time and resources need to be spend to obtain buy-ins from local authorities and local communities to ensure smooth implementation of the project;
7. Community level adaptation measures (pasture wells, sustainable agriculture, soil fixation, etc.) are better pursued through grant arrangements than through commercial tenders. Grants have shown to be more efficient in similar projects. They also help to catalyze stakeholder ownership by the communities themselves, since they are directly involved in carrying out the physical work, and contributing their own resources for co-financing;
8. The project proposals need have adequate workplans with elaborate workflows highlighting interdependences, and the project staff need to get advanced training in project management. This applies also to applying a more prudent financial approach to programmatic management; and
9. Care is needed to be exercised by UNDP when focusing on the same locations through several projects, especially if these involve extensive grant funded infrastructure measures. There is a risk of affecting the relations between neighboring villages, among others.

RECOMMENDATIONS

For UNDP:

- ✓ **Recommendation 1**: Publish and disseminate case studies on the most innovative adaptation measures, combining the technical descriptions and socioeconomic impact forecasts;
- ✓ **Recommendation 2:** Publish and disseminate easy- to- use instructions on the Operation and management (O&M) of the adaptation measures introduced to the communities;
- ✓ **Recommendation 3:** Develop, publish and disseminate Lessons Learnt: one was published on technical side of the adaptation measures; the case studies (combining the technical and socioeconomic impact related information in separate brochures, as in Recommendation No2) could be the 2nd; and the 3rd one should be on the institutional aspects of the WUGs;
- ✓ **Recommendation 4:** Finalize the editing of the video documentary about the project and arrange the airing;

- ✓ **Recommendation 5:** Conduct presentation(s) (could be in a format in one well-structured conference) ensuring the participation of the stakeholders not yet actively engaged, especially from the welayats not covered by the project;
- ✓ **Recommendation 6:** Conduct high-level discussions with the Government over linking the project results and national investment plans, field trips, and alike;
- ✓ **Recommendation 7: (**a) Complete the last round of the research initiated in Sakarchaga (b) initiate the last round of the socioeconomic impact analysis to capture late benefits and (c) complete the training on the two models (FAO and USDA) for the engaged parties: carry out these by linking these to the UNDP's new CRL project. Transfer the equipment purchased for the research in Sakarchaga to the CRL project;
- ✓ **Recommendation 8:** Translate the manuals for simulation exercises based on FAO AquaCrop and USDA NRCS SURFACE methodologies into Turkmen language, as was planned and hand it over to the Ministry of Agriculture and Water Resources, as well as the State Agrarian University**.** Carry out this recommendation by linking it to the new CRL project;
- ✓ **Recommendation 9:** Strengthen the information base (resource centres) for the pilot WUGs – to increase their chances of sustainable operations. Monitor the developments around the WUGs. Carry out this recommendation by linking it to the new CRL project;
- ✓ **Recommendation 10:** Utilize in full the opportunities for additional partnerships with the: (a) EU, GIZ, WB: to support the government in strengthening the agricultural extension services; (b) GIZ project on water basin management in Mary region and (c) FAO – the newly starting regional project on climate change adaptation, to share the accumulated experience and best practices
- ✓ **Recommendation 11:** Seek further funding from the international organizations to support transformative national and sectoral policy reform in state crops sector for scaling-up climate-resilient agriculture, and improved enforcement of water and land use regulations, coupled with accelerated wide-scale dissemination of water saving and resilient farming technologies and practices among smallholder farmers and state-run collective associations.

For **Government of Turkmenistan**

- ✓ **Recommendation 12:** link the project results with the national investment plans, field trips, and alike, promoting replication;
- ✓ **Recommendation 13:** Analyze the experience with the WUGs and take into account in the plans to introduce WUAs in Turkmenistan; and
- ✓ **Recommendation 14:** Formulate clear and time bound program for reforming rural water sector management linking it to land reform

1. INTRODUCTION

1.1. Project description and development context

1.1.1. Turkmenistan development Context relevant for this project

Economy: The strong growth performance, sustained over a decade, helped to lift Turkmenistan from a *low income* to an *upper middle-income* status. Gross Domestic Product (GDP) per capita rose from US$970 in 2002 to nearly US$7,000 in 2013, and then US$16,532 in 2015.[1] Growth has been driven by natural gas exports, which amount to over 90 percent of exports, with the extractive sector accounting for nearly half of GDP. Sustained growth, continued improvement in living standards, an increased role for the private sector and economic diversification have become strategic government priorities for 2030.[2] The Turkmenistan population is about 5 million (2011).

Climate change. Turkmenistan is a predominantly arid country with over 80 percent of its territory characterized by desert (75 percent) and oases, with mountainous zones primarily along its southern borders. Turkmenistan has an area of 488,100 square kilometres. Only 3 percent of Turkmenistan's land is arable.[3] Meteorological drought is a semi-permanent condition in Turkmenistan. The country is inherently water scarce, characterized by a continental and very dry climate, with low levels of precipitation (on average only 191 mm of per year), and moisture (35 percent on average). Water runoff formation is fully dependent on natural flow from glaciers: it is estimated that 30 percent of glaciers feeding the waters of Turkmenistan have already been lost during the past century, as a result of global warming. Water shortages and periods of drought are common. Climate warming in Turkmenistan is progressing fast. The expected climate change effects are summarized below:[4]

- An increase in average annual temperature of between 4.2 and 6.1°C by 2050, which will include an increase in the number of extremely hot days (i.e. days over 40°C);
- A reduction in annual average rainfall between 15 and 56 percent by 2050;
- An increase in average regional evaporation rates of 48 percent by 2050;
- An increase in the frequency and intensity of drought and flood spells;
- A 15 percent reduction in flow rates for the Amu Darya and 30 percent for other river systems;
- A 10 percent reduction in run off rates in terms of surface water collected in national storage and distribution systems increasing to 30-40 percent during vegetation periods;
- Precipitation becoming more variable, with increased frequency and intensity of drought and flood spells;
- Total annual water resources decreasing by 5.5 billion m^3 (or 20 percent) by 2050, etc.

Water availability and supply are likely to suffer not only from increasing shortages due to elevated temperatures and overall climate aridification, but also due to competition for water arising from regional trans-boundary water issues.[5]

Irrigation and Agriculture. Agriculture is a critical sector of the economy, accounting for almost one-fifth of GDP and being the source of livelihood for half of the population. At present, agriculture consumes 92 percent of all surface waters available in the country (2 percent - communal and 6 percent - industry). Turkmenistan took an initial step in 1997-1998 in changing the status of most farmers

[1] http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD PPP (current international $). Growth has slowed slightly during the last 2 years
[2] WB (2014): "Turkmenistan: Diversifying the Turkmen Economy", Report No: ACS12651
[3] http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=TKM
[4] Project Document
[5] A trans-boundary river, the Amu Darya is the main source of irrigation for a number of countries in the region including Uzbekistan. The planned development of upstream hydro-electric projects in Tajikistan threatens the potential stability of downstream flows. The expected 15% reduction in flow of the Amu Darya by 2030 will have dramatic impacts on agriculture and food production in Turkmenistan. Other river flow rates are expected to decline at even faster rates (up to 30% reduction).

to "lease-holders." However, in practice, the rural economy continues to operate primarily under state control, with the government both controlling inputs and providing a market for produce for strategic crops (cotton, wheat, rice, and sugar beet). A few private producers and farm businesses have emerged in fruits and vegetable,[6] livestock[7], and processing sectors over the last decade, but virtually all cotton and wheat crops are grown under the system of state mandate and procured by the state at below-market prices. [*NB: Some initial positive steps to initiate reforms of this system for cotton have been recently taken by the government*]. To improve the productivity of these crops, the government provides some incentives to, mainly, commercial farmers (who are involved in the large-scale production of wheat, cotton or rice). Plus, almost all public investment is directed to production of these strategic crops (wheat and cotton in particular), based on an economic policy of self-sufficiency in grains and maintaining the export potential for cotton products. This policy has greatly affected the structure of the agricultural sector and its potential for production, since thousands of hectares of land under orchards, horticulture and fodder crops have been diverted to production of winter wheat.[8] This policy is being now somewhat relaxed (with the notable exception of cotton and especially grain sector): over recent years, the Government has begun to recognize the need to diversify the agricultural sector driven by increasing frequency of drought in agricultural producing regions, and the associated economic losses experienced by the state.

Turkmenistan's inherent aridity and reliance on agriculture as a source of both income and food, renders the country particularly vulnerable to climate change impacts. The following are critical underlying causes of vulnerability:

- ***Deteriorating irrigation infrastructure and subsidized water prices***. High water consumption levels are largely related to the inefficiency of irrigation systems, as opposed to high household consumption.[9] Tariffs are set by the Government on a below cost recovery basis, in part to mitigate the social impacts of market pricing, given that almost half of the population is employed in agriculture and approximately 55 percent resides in rural areas. As a result, incentives for water efficiency are largely absent, but recently the Government has introduced penalties for water wastage. The incentives to invest, and the quality of local service delivery for small holders suffer as well; and
- ***Small holders disproportionately affected***. Given the increasing water shortages and priorities assigned to cash crop production, the smallholder subsistence farmers bear a disproportionate burden of intensifying water deficits.

The government has dedicated significant budget allocations for technological upgrades in water infrastructure, primarily related to improving supply side delivery. This has been mostly on the ***upgrade of pumping stations and lining of canal systems*** so far: e.g. for the construction of an artificial lake, Altyn Asyr, and associated canal infrastructure, to collect drainage water to be used for irrigation purposes following natural purification. More recently, ***large scale investment in high efficiency irrigation technologies has also begun***, including (subsoil) drip irrigations systems, mobile sprinklers,

[6] The fruit and vegetable subsector is the most independent of the agricultural sectors in Turkmenistan with almost 100 percent of production generated privately both by independent farmers and leaseholders. This sector is highly productive but uses a land area which is negligible compared to the grain, cotton or livestock subsectors. Prices and availability fluctuate between seasons, reflecting an undeveloped processing sector and lack of appropriate technical facilities for cool storage, but the demand for locally sourced product remains strong

[7] The livestock subsector is dominated by the private sector (80 percent of all products produced): private rural households operate on a lease agreements' basis. Sheep and goats are mainly kept by the state associations due to relatively easier husbandry and production conditions. Despite a lack of state investment, livestock management is displaying a certain degree of efficiency and productivity.

[8] Climatic conditions have historically allowed the country to produce high quality fruit and vegetable products and prior to collapse of the Soviet Union, Turkmenistan was a major exporter of fruit and vegetables to northern parts of the Soviet Union. Over recent years, land allocated to produce winter wheat was increased almost five times largely at the expense of areas dedicated to feed, fruit and vegetable crops.

[9] water consumption per capita in Turkmenistan is more than twice that of any other country in Central Asian. However, some 28 percent of Turkmen are without access to potable water sources

and wastewater capture and reuse. Overall, however, agriculture is still hugely capital and labour intensive, with low productivity, despite the purchase of large scale agricultural machinery.

Water deficit and allocations and the growing appreciation of the importance of rural economy. The Government understands, that an approach based on supply side infrastructure may not be sufficient and at the start of the project there were signals of planned reforms (see **Section 3.1.1**). The government is also concerned with rising water deficits. According to the Water Code, the Cabinet of Ministers annually sets water use limits for each of the political-administrative units - five *welayats*- and each *etrap*,[10] as well as for each sector of the economy, and defines water extraction limits for each water source. The concerns about water deficits have prompted the Government of Turkmenistan (GoT) in the recent years to appreciate the importance of rural development more (over US$4 billion has been pledged) [7] toward these priorities.

1.1.2. Conceptual Background

The project appears to have been driven by two main processes. The sustainable land management (SLM) project funded from the Global Environment Facility (GEF) and the German Agency for International Cooperation, GIZ was one of these. This medium-sized project (MSP) project on "*Capacity building and on-the-ground investments for SLM*"[11] (2007 to 2010) with the (then) Ministry of Nature Protection as the national executing partner (the same as for the current project at the start) served as the basis for consultation in development of the proposal for the current project, including the selection of potential sites (the mountainous area of Kopet Dag; the sandy desert region of Karakum and the area of intensive irrigated agriculture of Mary), community consultation, and assessment of agricultural and water requirements. In addition to the significant influence of the SLM project, there had been a number of previous projects and initiatives in Turkmenistan that established the foundation for the current project. These projects are comprehensively listed in Annex 3 of the project document (ProDoc), and include, for example, a project funded through the US Agency for International Development (USAID) from 2005-2007 that piloted Water User Associations (WUA) in Turkmenistan.

At the same time, around 2010, United Nations Development Programme (UNDP) and the GoT sought to utilize resources from the newly established Adaptation Fund (AF) to respond to climate risks in Turkmenistan's agricultural system, with negative climate impacts becoming more evident from one year to the next. According to the project document (ProDoc), "*This project has emerged as a result of findings outlined in Turkmenistan's Second National Communication and the Investment and Financial Flows (I&FF) assessments undertaken by UNDP with the Ministry of Natural Resources and the Turkmenistan United Nations Framework Convention on Climate Change (UNFCCC) focal point. The scope of this project was conceived by the Ministry of Environment in consultation with national experts and key personnel of the Ministry of Water Economy and other organizations."*

These two related influences culminated in the current project. The full project document was developed in late 2010 and early 2011.

1.1.3. Problems the Project Sought to Address

As outlined in the Project Document (ProDoc), there are multiple potential climate risks that the project sought to address. Water scarcity for agriculture is a primary factor, resulting from and in conjunction with increased temperatures, as described in **Section 1.1.1**.

Two further underlying causes of vulnerability are identified as: (a) deteriorating irrigation infrastructure and subsidized water prices; and (b) allocation of water resources to irrigate intensive cash crops due to historical reasons related to the Soviet period. The bullet points below summarize the key policy, institutional and knowledge related barriers to addressing immediate and long-term

[10] administrative units below welayats

[11] GEF ID #3239, which was part of the "Central Asian Countries Initiative for Land Management (CACILM) program.

adaptation needs in the water sector in Turkmenistan at the start of the project (2010-2011) that it sought to tackle (from the Project Document (ProDoc)):

- limited administrative or incentive measures for water saving and efficiency, combined with a push to deliver commitments under state plans, forcing farmers to plant more crops and use irrigation water excessively;
- the Water Code from 2004 being an impediment for a more progressive water governance system to emerge, with unclear roles for potential local water users' associations and lack of incentives for establish those, including water pricing policies not capturing the real price of water to major water consumers;
- lack of systematically recorded and processed climate and socio-economic data to underpin more informed decision-making on water allocations, technologies and management.
- limited knowledge of tools and methods for socio-economic impact assessments and prospective planning techniques to allow for cost-effective adjustments and better preparedness of water and other vulnerable sectors to anticipated climate change risks; and
- limited access of local rural communities of the mountainous parts of Turkmenistan, oasis and desert systems to communal services (through associations, etc.) to ensure uninterrupted water delivery.

Most of these barriers still persist to a large extent: this will be addressed throughout the report. Back in 2011 the problems were clearly and well identified.

1.1.4. Project Description and Strategy

The total AF contribution to the project budget is US$2,700,000. With a project cycle management fee of US$229,500 to UNDP, the total cost to the AF is US$2,929,500. The project was planned to be implemented over 60 months (five years). As stated in the ProDoc, the ***UNDP/AF project aims to achieve greater water efficiency and productivity under climate change induced aridification by strengthening water management practices at national and local levels in response to climate change induced water scarcity risks to local farming systems in Turkmenistan***. Thus, the objective (long term expected outcome) of the project is "*…to strengthen water management practices at both local and national levels in response to climate change-induced water scarcity risks that are increasingly affecting farming systems in Turkmenistan."* The objective was to be achieved through three outcomes consisting of nine total outputs:

- ***Outcome 1: Institutional capacity to develop climate resilient water policies in agriculture strengthened***
  - ***Output 1.1.*** Socio-economic impact of climate change on water availability costed and documented, including cost-benefit analysis of adaptation measures; and
  - ***Output 1.2.*** A package of modifications in the water code, with particular focus on communal water management; and financial incentives for water efficiency (e.g. differentiated and progressive tariff) developed.
- ***Outcome 2: Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches***
  - ***Output 2.1***: At least 4,000 agri-pastoralists of the Nohur mountainous region develop and implement water harvesting and saving techniques (such as slope terracing, small rainwater collection dams, contour and stone bunds, planting pits, tillage, mulching) to improve soil moisture levels;
  - ***Output 2.2:*** At least 8,000 farmers implement community-based well and watering point management measures, including sand fixation and introduction of drought resistant traditional grain varieties in the Karakum desert region; and

- ***Output 2.3***. At least 20,000 farmers in the Sakarchaga area benefit from improved irrigation services through the introduction of canal level, localized management practice.

- ***Outcome 3: Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the three target agro-ecological zones***
  - ***Output 3.1***: Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 30,000 farmers and pastoralists;
  - ***Output 3.2:*** Based on Vulnerability and Capacity Assessments (VCA) assessments, community-based adaptation plans with particular focus on water delivery services designed and implemented through the government's social development programmes with direct engagement of at least 30,000 farmers and pastoralists;
  - ***Output 3.3***: At least 6 projects funded up to a total of US$400,000 through WUAs and associated community groups; and
  - ***Output 3.4:*** Lessons learned on community-based adaptation options under various agro-climatic conditions of Turkmenistan disseminated through Adaptation Learning Mechanism (ALM) and other networks

The expected project results are to some extent specified in the language of the project outputs, but the full project results are outlined in the project results framework, included in Annex 10 to this Terminal evaluation (TE) report.

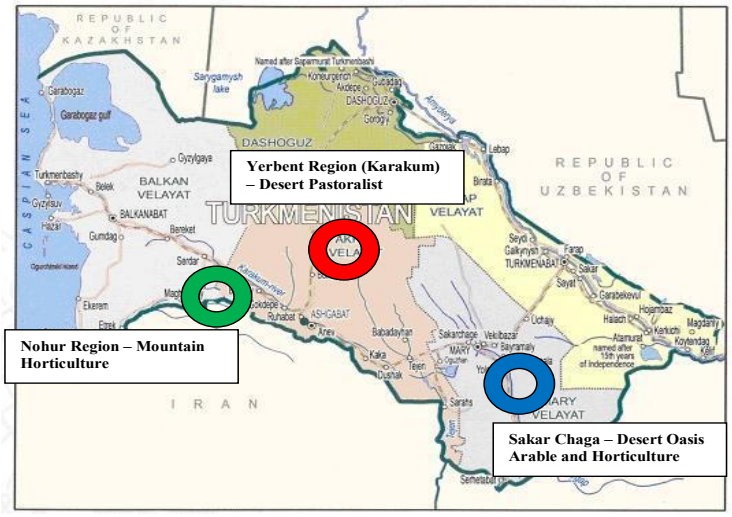
The project field-level activities are carried out in three pilot locations: Nohur, Karakum, and Sakarchaga. The main characteristics of these sites are summarized in **Table 4** below.

Table 4 AF Project Pilot Location Key Characteristics

	Nohur	Karakum	Sakarchaga
Ecotype	Mountainous	Desert	Oasis
Agriculture type	Arid mountain pasture animal husbandry of cows, sheep, and goats; irrigated vegetable and fruit cropping	Desert pastoralism of camels, cows, sheep and goats	Irrigated production primarily of cotton and wheat
Area	9,000 ha	842,000 ha	53,000 ha
Population	12,000	8,000	132,000
Location in country	Southwest (Central Kopetdag Mountains)	Central (Karakum Desert)	Southeast (Mary welayat Oasis)
Land tenure type	Private communal agriculture plot	Pasture leaseholder	Agriculture field leaseholder (average ~5 ha per family)
Status at the onset:	A number of small water infiltration dams have been constructed on the cleared slopes to increase the infiltration of the rainwater into the soil, as short-term solution. The dams constructed in ravines capture the water streams, which form during heavy rains, thus increasing the moisture in the soil and assisting in restoration of the vegetation. One village (Konegummez) is piloting drip irrigation systems for a 10ha orchard with plans for a further 30 ha alongside reduction of livestock numbers. Additional activities have been undertaken	A number of measures have been undertaken in relation to improved pasture management that have proved successful. For example, Rukhabat Etrap has seen about 30 ha of reed reinforcement and 27 ha of saksaul planting to improve fixation of sand dunes. There have also been small scale repair and construction of water wells to expand the area of pasture land in use, thereby avoid localized degradation. Concrete water management requirements have been identified through	Salinized soils are being regenerated and returned to productivity for small holders through composting. In particular high-quality humus is being produced to improve soil salinity. SLM techniques are being taught to young farmers. Restoration of degraded lands is being pursued in collaboration with local authorities, including bush clearance of 50 ha, ploughing, and desalination through preventive leveling. Water user plans have begun to be elaborated for a small number of water users. One new collector (3.3km) was constructed and an existing channel of 6.4Im cleared to improve

	Nohur	Karakum	Sakarchaga
	to replant juniper trees to try and stabilize the soil and increase moisture retention with up to 100 ha of replanting. .	the GTZ SLM project, and an opportunity exists to integrate water management into Village Development Plans (VDPs).	collection of drainage water in the region. In addition, up to 60 measuring points have been installed to monitor the level and mineralization of ground water.

Figure 1 Location of AF Project Pilot Regions in Turkmenistan



Source: MTE

Main stakeholders and duration of the project

Ministry of Nature Protection of Turkmenistan (as it was then called) was the main partner of the project at the start. Due to the reorganization of the Government of Turkmenistan (GoT) in 2016 the State Committee of Turkmenistan on Environment Protection and Land resources was formed which then became the main partner of the project. Project started on 1/10/2011 (even through the ProDoc was signed later, on 08/12/2011) and was supposed to be completed by 30/09/2016 (5-year duration), but in 2016 it was extended by one year to September 2017

1.1.5. Purpose and scope of the evaluation

The objective of the Terminal Evaluation (TE) is to provide a comprehensive and systematic account of the performance of project results by assessing its design, process of implementation and achievements against the project objectives, endorsed by the UNDP and AF, including any agreed changes in the objectives during project implementation and any other results, as well as to draw lessons learned that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming. More specifically, the TE has three complementary purposes:

- To evaluate relevance, effectiveness (extent and quality of the achievements of results (outputs) and contribution to the planned Outcomes and impacts), efficiency and potential for sustainability and scaling up of the project;
- To document and provide feedback on lessons learned; and
- To suggest recommendations pertaining the replication of the project successes, management issues, as well as recommendations of corrective nature related to this particular project.

The evaluation was conducted based on five main evaluation criteria, as identified by the Organization for Economic Cooperation (OECD) Development Assistance Framework (DAC) and the AF Evaluation Framework. Those criteria are listed below:

- *Relevance*: to local and national sustainable development plans, priorities, and policies; poverty alleviation plans; national communications or adaptation programmes and other relevant instruments; objectives of the AF; and the guidance from the relevant conventions;
- *Effectiveness:* The extent to which the intended outcomes have been achieved or how likely it is that they will be achieved;
- *Efficiency:* A measurement of how economically the funds, expertise, time, etc. provided by the AF have been converted into results;

- *Impact:* The positive/negative and unforeseen changes to, and effects produced by, the AF support, individually or at the aggregated level; and
- *Sustainability*: Likelihood of continued benefits for an extended period of time after project completion. Risks to sustainability (financial; socio-political; institutional; governance; and environmental) assessed and addressed.

The evaluation addresses the evaluation criteria and issues described in **Table 5**, with the evaluation questions detailed in the Evaluation matrix in Annex 9,

Table 5: Evaluation criteria and issues

Evaluation criteria	Explanation	Evaluation issues
Relevance	Relevance (adequacy) of the Project concept and design	Assessment of the relevance of the project concept and design (relevance of individual components/coherence), including and assessment of the appropriateness of the: (a) objectives, planned outputs, activities and inputs as compared to cost-effective alternatives; (b) the executing modality and managerial arrangements; (c) timeframe and budget; (d) indicators; and (e) work plan
Efficiency	Quality of Implementation	Assessment of the implementation of the project in terms of: (a) quality and timeliness of inputs and efficiency and effectiveness of activities carried out; (b) effectiveness of management (including adaptive management); (c) quality and timeliness of monitoring and backstopping by all parties to the project; (d) adaptive management in project implementation; and (c) the extent to which the implementation of the project has been inclusive of relevant stakeholders and to which it has been able to create collaboration between different partners
Effectiveness	Extent of the achievement and quality of the planned outputs and contribution of the envisioned outcome and Income	An assessment of the: (a) achievement of the immediate objectives; (b) contribution to attaining the expected outcomes and overall objective of the project; (c) significant unexpected effects, whether of beneficial or detrimental character; and (d) factors contributing the attainment of the above
Potential for sustainability and scaling up	Potential for the (a) viability of the project results beyond the project timeframe; and (b) replication of successful initiatives by project partners in their programs	An assessment of the: (a) potential for the viability of the project results beyond the project timeframe; (b) financial socioeconomic, environmental, governance and institutional risks; and (c) potential for the stakeholders (including the government) to uptake and replicate the project results (pilots, practices, etc.) in their own programs
Lessons Learnt	Positive or negative, related to program components as well as program management	Documenting of the lessons learnt (positive or negative) that can improve the performance of similar projects, and aid in the overall enhancement of UNDP programming
Recommendations	Corrective measures Other recommendations	Recommendations related to both this project (corrective measures) and other measures for UNDP Turkmenistan programming that could enhance the results and sustainability of this and similar projects and enhance UNDP programming in Turkmenistan overall

Structure of the evaluation report

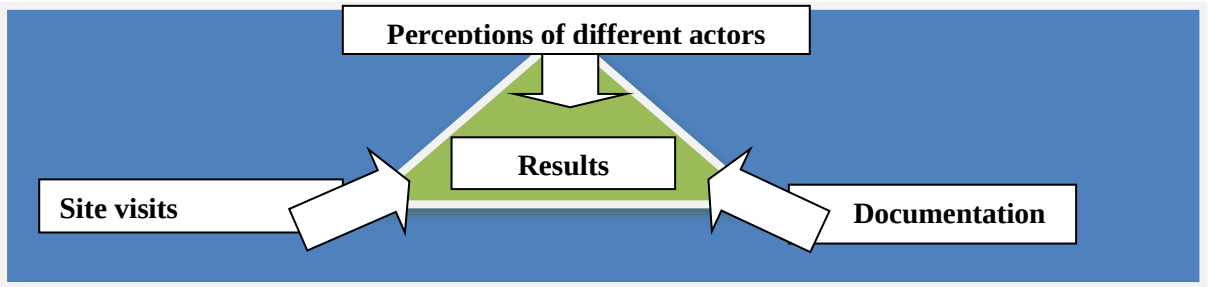
The structure of the Evaluation report follows the requirements of the TOR.[12] **Chapter 1** describes the project and its development context, **Chapter 2** describes the Methodology, **Chapter 3** describes the Findings, **Chapter 4** presents Conclusions, **Chapter 5** lists the main lessons learnt and **Chapter 6** concludes with Recommendations.

[12] See **Terms of reference**); Slightly modified in the layout for logical consistency but covering all the requires issues

2. METHODOLOGY

The evaluation follows a participatory and consultative approach ensuring close engagement with Government counterparts, the stakeholders based in three (3) target pilot regions, UNDP Country Office (CO), Project Team, AF and other partners, as well as the key experts and consultants in the subject area. The evaluation is guided by (a) UNDP Handbook on Monitoring and Evaluation (M&E) for Results and UNDP Evaluation Policy kit; and (b) AF M&E framework

Figure 2: Method of Triangulation



To ensure that the evaluation provides evidence-based information that is credible and reliable **triangulation** is used as the main evaluation method, to verify the information gathered from the document review, interviews and the site visits (see Annex 2 for the schedule). The TE involves developing the reliability of the findings through multiple data sources of information (see ***Figure 2*****Error! Reference source not found.**) bringing as much evidence as possible into play from different perspectives in the assessment of hypotheses and assumptions.

- ***Desk study*** included the review of the: Project Document (ProDoc), project reports – including Annual Project Progress Reports (PPRs), Combined Delivery Reports (CDRs); Annual Workplan (AWP); Tracking Tools, project budget revisions, progress reports, project files, national strategic and legal documents, Project Board Meeting (PBM) Minutes; Mid-term Evaluation (MTE) report, Government strategies, relevant publications of UNDP Turkmenistan, third party reports (e.g. World Bank (WB)) and other materials. The list of documents is included in Annex 4
- The TE included ***field missions*** to project sites in three (3) pilot regions – Nohur (mountainous area), Karakum (desert area) and Sakarchaga (oasis area);
- ***Interviews*** were held with the following organizations and individuals (see Annex 3):
    - UNDP CO management, Project Implementation Unit (PIU), and relevant Programme staff;
    - UNDP/AF project staff;
    - Representatives of the implementing partner - the State Committee of Turkmenistan on Environment Protection and Land resources;
    - Representatives of the Ministry of Agriculture and Water Resources of Turkmenistan;
    - National Project Coordinator;
    - Heads of the Environmental and Economic Committees of Mejlis;
    - Representatives of farmers' *(daikhan)* associations and Water User Groups (WUG) in the three project pilot regions;
    - Representatives of the Scientific Research Institute of Water Systems Design;
    - Representatives of the State Agrarian University;
    - Project experts and consultants; and
    - Representatives of other donor projects (e.g. European Union (EU); and GIZ)

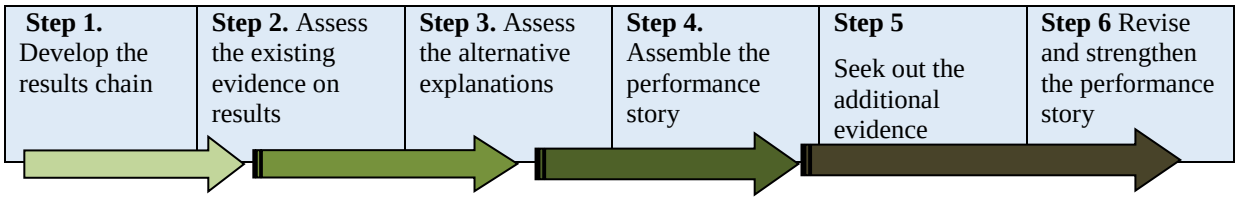
Table 6 presents a mapping of evaluation tools and the sources of information. The Evaluation matrix presented in Annex 9 provides more details**.**

Table 6: Evaluation tools and sources of information

Evaluation tools	Sources of information	
Documentation review (desk study)	General documentation	• UNDP Programme and Operations Policies and Procedures • UNDP Handbook for Monitoring and Evaluating for Results • AF Evaluation Framework
	Project documentation	• ProDoc, CDRs, PPRs, AWPs, • Financial audit reports • Project Board Meeting (PBM) Minutes • Risk log
	Governments papers	including policies, laws, strategies, etc.
	3rd party reports	including those of the World Bank, EU, EBRD, GIZ, FAO, independent research centres, etc.
Interviews	With key project stakeholders	
visits of pilot sites	Visits to Sakarchaga, Karakum, and Nohur	

The project performance is measured based on the indicators of the project's logical framework included in Annex 10. In the assessments of the outcomes an attempt is made to attribute the results to the project when feasible: when not feasible, **contribution analysis** is used, which is presented schematically in **Figure 3**.[13]

Figure 3: Contribution Analysis



The report is intended to meet the needs of all the related parties (AF, UNDP, project partners, local communities and other related parties in Turkmenistan and foreign countries).

Rating

In compliance with the TOR, the TE rates the project on the following performance criteria: (a) M&E design at entry; (b) M&E Plan Implementation; (c) overall quality of M&E; (d) relevance; € effectiveness; (f) efficiency; (g) overall Project Outcome Rating; (h) Quality of UNDP Implementation – Implementing Agency (IA) and Quality of Execution - Executing Agency (EA); (i) overall quality of Implementation / Execution; (j) sustainability of financial resources; (k) socio-political Sustainability; (l) institutional framework and governance sustainability; (m) environmental sustainability; and (n) overall likelihood of sustainability. The applicable rating scales (in compliance with the TOR) are presented in **Table 7**

Table 7: Rating scales

Ratings for Progress Towards Results: (one rating for each outcome and for the objective)		
6	Highly Satisfactory (HS)	The objective/outcome is achieved or exceeds all its end-of-project targets, without major shortcomings. The progress towards the objective/outcome can be presented as "good practice"

[13] based on John Mayne, "Addressing Attribution Through Contribution Analysis: Using Performance Measures Sensibly', The Canadian Journal of Program Evaluation Vol. 16 No. 1 Canadian Evaluation Society, 2001

5	Satisfactory (S)	The objective/outcome is achieved most of its end-of-project targets, with only minor shortcomings
4	Moderately Satisfactory (MS)	The objective/outcome is achieved most of its end-of-project targets but with significant shortcomings
3	Moderately Unsatisfactory (HU)	The objective/outcome is achieved of its end-of-project targets with major shortcomings
2	Unsatisfactory (U)	The objective/outcome is not achieved of most of its end-of-project targets.
1	Highly Unsatisfactory (HU)	The objective/outcome has failed to achieve any of its end-of-project targets.
Ratings for Project Implementation & Adaptive Management:		
6	Highly Satisfactory (HS)	Implementation of all three components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation and adaptive management. The project can be presented as "good practice".
5	Satisfactory (S)	Implementation of most of the three components is leading to efficient and effective project implementation and adaptive management except for only few shortcomings.
4	Moderately Satisfactory (MS)	Implementation of some of the three components is leading to efficient and effective project implementation and adaptive management, with some components' significant shortcomings.
3	Moderately Unsatisfactory (MU)	Implementation of some of the three components is not leading to efficient and effective project implementation and adaptive management, with most components' shortcomings.
2	Unsatisfactory (U)	Implementation of most of the three components is not leading to efficient and effective project implementation and adaptive management.
1	Highly Unsatisfactory (HU)	Implementation of none of the three components is leading to efficient and effective project implementation and adaptive management.

Limitations

All evaluations face limitations in terms of the time and resources available to adequately collect and analyze evaluative evidence. For this evaluation, the fact that visiting all the field locations where project investments have been made is a limitation, though sites were visited in all three project pilot regions. Also, a few of the project documents were available only in Turkmen language, although the project team and UNDP worked to ensure that language was not a barrier to the collection of evaluative evidence. In addition, all key documents were available in English and/or Russian. Altogether the evaluation challenges were not significant, and the evaluation is believed to represent a fair and accurate assessment of the project.

3. FINDINGS

3.1. Relevance

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3.1.1. Relevance of the Project

Turkmenistan ratified the United Nations Framework Convention on Climate Change (UNFCCC) on July 5, 1995 and the Kyoto Protocol to the UNFCCC in December, 1998. Turkmenistan is also a signatory of Paris Climate Accord. The project was also in line with Government Programs and Strategies valid at the time:

- ***Programme of Agricultural Development to 2030***;
- ***The Concept Note for Development of Water Economy to 2030***;
- ***The National Programme "The Strategy of Economic, Political, and Cultural Development of Turkmenistan Until 2020***", which envisages an increase in agricultural production more than 15 times only due to utilisation of the current natural resource and accelerated industrial potential. A considerable proportion of irrigated agricultural lands is planned to be transferred to private sector enterprises (including joint-stock companies, daikhan (farmer) cooperatives

and unions), which are expected to introduce more effective and efficient water use technologies and water saving practices;[14]

- ***The National Socio-Economic Development Strategy of Turkmenistan to 2030,*** which pursues the objective of modernization of the water management system and improving water efficiency, as well as increasing water storage capacity;
- ***UNFCCC Second National Communication (2011***) sets out the projected water deficit under current climatic projections, and outlined a number of policies and measures for the agriculture sector to mitigate impacts, identifying water sector as the most important adaptation priority in Turkmenistan. This document. The ***I&FF assessment*** (2010) undertaken by UNDP and the GoT also identified the water sector as the primary area for adaptation investment. It concluded that in addition to ongoing programmes of supply side infrastructure investment and upgrade, it was important to develop an effective demand side response and establish management systems that would result in sustainable use and allocation of increasingly scarce water resources;
- ***The GoT five-year water programme,*** existing at the time**,** which specifically promoted the more rational use of water;
- ***The National Agricultural Strategy,*** which specifically identified the water requirements to meet state targets for strategic crop production.
- ***The Law "On Daikhan Farms"*** (2007) setting out water provision requirements as central to the development of private sector agriculture, horticulture and livestock (with an expected increase in the role of private farms, cooperatives and joint stock companies);
- Existing legislative procedure regarding ***Basin Schemes on Integrated Use and Protection of Water Resources***;
- ***Law of Turkmenistan "On State Support for Small and Medium Size Enterprise"(2009),*** which supports the extension of private sector provision in the rural agriculture sector, including economic diversification into agro-processing industries;
- ***The Water Code from 2004 (now replaced),*** with its key provisions including a clause on the participation of non-governmental organizations (NGOs) and wider public/communities' organizations in water use and protection; etc.

The project was in line with the:

- ***Millennium Development Goals (MDGs)***, in particular, MDG7: "*Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources"*. Now it is in line with the ***Sustainable Development Goals (SDGs),*** **and in particular** SDG 13 on *Climate Action.*

- UN and UNDP Turkmenistan programmatic priorities at the time, including:
    - ***United Nations Development Assistance Framework (UNDAF) Outcome*** 3: *By 2015, the system of environmentally sustainable economic management expands people's opportunities to participate in social and economic development, especially in rural areas*; and
    - ***UNDP Country Programme (CP) Outcome 3.2*** (*"Environmentally sustainable use of natural resources contributes to effectiveness of economic processes and increased quality of life*") and, in particular, ***Output 3.2.2:*** *Local communities contribute to and benefit from sustainable use of natural resources;*

- UNDP Energy and Environment portfolio level objective "*to increase adaptive capacity to respond to the impacts of climate change, including variability at local and national level*".

While the reforms since 2011 have progressed slower than was anticipated (this is addressed in Section 3.2 of this report), the interviews undertaken as part of this evaluation indicated that GoT has come to realise that:

a. water is one of the key driving forces for its economic development, and under conditions of

[14] The government had stated its aim of moving irrigated lands from a position of 90 percent state ownership to majority ownership by the private sector by 2020

increasing scarcity water infrastructure needs to be upgraded to minimize losses to the system;
b. there is a need to move to more progressive pricing for irrigation water (process of installing water meters is ongoing); and
c. agriculture should be diversified more, with more land now available under longer term lease (more people opting to lease for 39 years) in lead to the introduction of private ownership.

Also "*The Working Programme for the rational use of water resources in Turkmenistan and enhanced flow of the Karakum River for the period of 2015-2020*" was adopted in 2015. So, the project is relevant even today.

The project was complementing other projects active at the start of the current project e.g.:

- ***UNDP/GEF*** and ***GIZ co- supported SLM project*** under the Ministry of Nature Protection (as it was called then), mentioned in Section 1.1.2 of this report. The AF project is seen as not only being based on SLM but also being complementary to the land management activities under that project, addressing the impact of the water stress on local community farming and pastoral systems. Some of the measures tested by the UNDP-GEF project (such as dune fixation and stabilization, restoration of vegetative cover) remained relevant for the AF project as well and the lessons on best practices from that initiative informed the current UNDP/AF project (see also the next paragraph);
- ***UNDP's regional Climate Risk Management (CRM) programme for Central Asia***; and
- ***EU's "Support to Further Sustainable Agricultural and Rural Development",*** latest (at the time) in a series of activities running since 2005 to strengthen capacity within the Ministry of Agriculture (as it was called then).

None of the projects listed above focussed specifically on the policy reform related to water-agriculture nexus, or regional dissemination of adaptation practices and technologies, so the UNDP/AP project was filling an important gap. In the case of the UNDP/GEF/GIZ SLM project, while it was in many ways a predecessor of the current UNDP/AF project, in the case of the UNDP/AF project, the design of the adaptation measures, their spatial distribution and scale was planned to be informed by the climate change risks that were not considered in the SLM initiative, addressing adaptive water issues, such as the introduction of watering points for pastoralists, innovative communal management modalities for water service delivery, e.g. seasonal water rationing and flexible payment options.

United Stated Agency for International Development (USAID) did not have an active water or agricultural programme in Turkmenistan at the time when the ProDoc was developed, but prior to 2008, has implemented a number of relevant initiatives.[15] The *Organization for Security and Cooperation in Europe* (OSCE) had a limited number of small agriculture grant - based projects (US$10-20K) with no overlap with UNDP/AF plans. From the perspective of International Financial Institutions (IFI), at the time of the elaboration of the ProDoc, the *European Bank for Reconstruction and Development* (EBRD) and the *World Bank* (WB) had limited operations within the sector and the *Asian Development Bank* (ADB) while has included Turkmenistan in a number of regional environmental and land use programmes (e.g. the *Central Asian Countries' Initiative for Land Management*), had limited activities in the country.

Thus, there was no duplication but rather strong complementarity with the existing and planned programs. Another observation is that overall, the number of projects in Turkmenistan is not large which makes the AF project even more important and relevant.

[15] From an agricultural perspective, during 1991-2008, USAID provided 255 volunteer agricultural experts to support the development of private agricultural support services and registration of cooperatives. During 2004-2006, USAID worked with 15 farmer organizations in Mary and Dashoguz provinces to support economic expansion through provision of power, water supply and irrigation networks to increase agricultural productivity. During 2006-2007, there were also a number of agricultural market initiatives, and technology support programmes dealing with greenhouses, soil testing laboratories and fertilizers. USAID is also active in the field of economic diversification. No overlap was identified, and the project proposal was welcomed. Experience gained by USAID, particularly in Water User Associations and in the private sector provision of agricultural and horticultural services will be integrated into project delivery.

Given the background/context described in Section 1.1 and this Section, it could be concluded that the project was very relevant for the country (with the rating ***"Highly Relevant /HS".***

3.1.2. Relevance of the Project design

Project design is rated as ***Moderately Satisfactory (MS).*** The rationale for this rating is described in the subsections below.

The rationale behind the program design according to the ProDoc

There are a number of questions that the GoT faces in its desire to improve water availability from the perspective of climate resilience and cost efficiency for the significant proportion of the rural population that is engaged in small scale agriculture and livestock management. The project sought to assist the Government in responding to these questions in an integrated way. These questions include(d):[16]

- What are the impacts of projected climate change on rural agricultural and livestock based communities within Turkmenistan who may not have access to large scale water infrastructure?
- What are the most effective technologies and management techniques for small scale rural demand management from a cost/benefit perspective, and how do these compare with supply side equivalents? Is it feasible to prioritize measures on a resource and cost efficiency basis?
- How do these water technologies and management techniques differ in terms of their suitability for different climatic and agricultural profiles within Turkmenistan and where are they best deployed?
- What are the most suitable delivery mechanisms for the provision, management and maintenance of sustainable water management systems?
- Can fiscal and billing mechanisms for water delivery be expanded to encourage more rational use of water by larger scale users without affecting poorer populations, thereby resulting in a more equitable allocation of water at a regional or river basin level?
- How can water and climate change considerations be integrated into agricultural sector and economic development planning, and what tools exist to facilitate this, particularly in relation to sustainability and resilience?
- Having identified potential solutions, what is the most effective way of scaling up community level best practices to national level, and how can knowledge be captured and replicated within national social development mechanisms?

Project components

These questions prompted the design of the Project in three (3) components: these are described below: Error! Reference source not found. (which is from the ProDoc, and while useful is not a results chain) and in the reconstructed (by the author of this report) results chain in **Figure 5**

- ***Component 1: Policy and Institutional Capacity Strengthening***

The intended focus of the first component was on improving *the fiscal* and *management approaches* by the Government towards water use in the state agriculture sector, in order to support the adoption of high efficiency irrigation techniques. This was thought to be important for local communities given that water is diverted away from private sector agriculture and horticulture towards strategic state crops: it was thought to be important to weigh the cost-effectiveness of various supply and demand side approaches, and by comparing these costs against the potential socioeconomic impacts of climate change help to build a sustainable basis for water adaptation. This was thought to be relevant also given that technical skill-sets and guidance are lacking locally to undertake such analysis (along with other knowledge gaps, including understanding of the requisite legal and regulatory foundations). This

[16] ProDoc

economic evidence base was expected to (a) be used to support water and agriculture modelling activities undertaken separately by the Ministries of Water Management and Agriculture (as they were called at the time); (b) inform the water legislation to include climate change considerations, and (c) help introduce regulations that support progressive water pricing and the communal management of water delivery services by the end of 2014. The linkages between water and potential reforms under the land use masterplan were also expected to be established.

- ***Component 2: Community-hosed adaptation initiatives***

Recognizing that Turkmenistan has limited experience with community based adaptation approaches and a historic preference for adopting large scale supply side infrastructure solutions, it was considered vital that the project demonstrates the efficacy (costs and benefits) of the various community scale water adaptation approaches (drip irrigation, harvesting, water points, terracing, intercropping, saksaul planting, irrigation canal improvements etc.), targeting primarily private sector agriculture. The lessons from these regional pilots were to be used not only to inform the legislative reform process relating to land management and water use/pricing falling under the Component 1, but also inform the development of larger scale communal management systems and their integration into the Government's social development and poverty alleviation strategies in Component 3. The majority of AF resources were to be allocated for the implementation of these concrete water and agricultural adaptation interventions at the community level. With the latter point, the project took a bottom-up approach in assessing vulnerability and adaptive capacity in three agro-ecological regions - mountain, desert and oasis (with agro-pastoralist, pastoralist and settled irrigated agriculture practices, respectively) to allow more effective replication. Component 2 used Vulnerability and Capacity Assessments (VCA) at these communities as a basis for (a) the analysis of existing and potential natural resource challenges to the sustainable development of the agro-pastoralist systems and (b) the selection of measures in each – in consultations with the community members - to be supported financially and with technical expertise to help overcome water related limitations to their local productive systems.

- ***Component 3: Strengthening communal systems for water delivery.***

Component 3 sought to implement efficient communal water management systems in the selected regions, through the development of Water User Associations (WUAs) and the integration of communal water practices into wider social safety nets. This was to be preceded by the adoption of the Law on WUAs (drafted with project support), followed by the support to the communities in establishing these WUAs, and their strengthening with mandates and community investment plans in the three identified regions. After these, funds were to be provided to finance at least four (4) water adaptation projects to be designed and implemented by the WUAs (with grants), selected on the basis of potential impact (improvements in water quantity and efficiency), leveraging external government funds where appropriate. Lessons were to be identified and scaled up to the national level. This was to enhance the ability of communities to improve water delivery services, through improved management rights and greater accountability, filling the identified gap in the availability of non- technological, communal management solutions for water productivity. WUAs were to be supported to develop mechanisms to support water efficiency systems with, for example, seasonal water rationing and more flexible payout mechanisms.

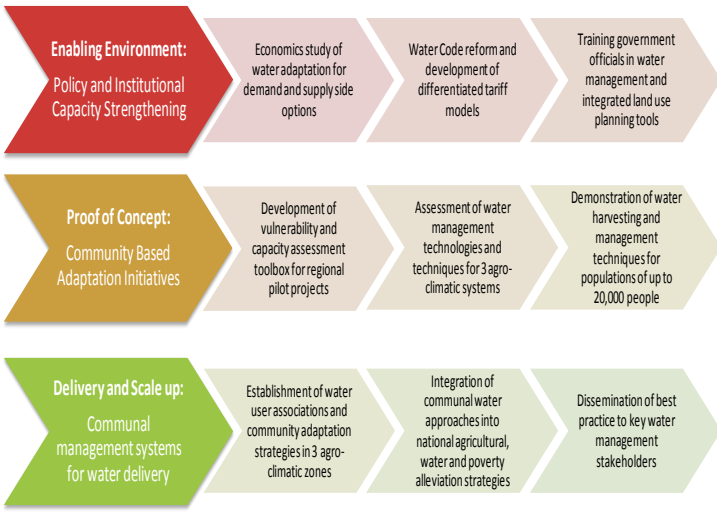
By design, the three components were to be closely linked, as

- the scale-up of community level water management and delivery mechanisms was to be based around technologies and techniques proven in Component 2, supported by the economic analysis and legislative changes set out in Component 1; and
- for the water related adaptation measures under the Component 2 to be sustainable over time, locally appropriate communal management structures will have to be in place.

On the whole, the project design and strategy is logical, pairing the interventions at national level addressing the policy context, with field level demonstration activities.

As a positive feature, the ***design of the project was informed*** by UNDP's:

Figure 4 Rationale for Turkmenistan Water Adaptation Program



- ***assessment of I&FF for Government adaptation activities in the water sector*** (under the Second National Communication for UNFCCC). I&FF identified the introduction of economic instruments and financial mechanisms needed to make water supply self-sustaining under a climate change baseline, with a caution that such instruments and mechanisms need to be carefully designed and applied. The assessment also identified the need for fundamental capacity development in key institutions in this. In addition, further recommendations suggested reaching out to the most vulnerable communities in various agro-ecological zones to tailor and implement local adaptation measures, that improve access to water and promote livelihood resilience. The UNDP/AF project sought to implement such priorities as identified and prioritized by the government;
- ***analysis of water and land use legislation***. This analysis concluded that an opportunity exists for the implementation strategies to achieve the stated aim of improved water efficiency and associated increases in agricultural outputs; and.
- ***study on institutional and policy mechanisms within the water sector*** targeting both upstream and downstream level activities

The Project approach, as described in the ProDoc includes also the aspects, which are listed below with the descriptions and commentary/assessment of relevance:

(a) ***A comprehensive approach***

This primarily means that ***activities were designed at both national and local levels, but with***

- ***A high proportion of funds flowing into capacity building activities and demonstrations of low cost, demand driven resilient technologies and management structures,*** expected to result in a higher adaptation benefit than an equivalent investment into capital intensive infrastructure. Moreover, the majority of activities were aimed to deliver concrete adaptation benefits to identified communities by implementing "hard" water efficiency and irrigation measures, e.g. improvement of water retention and harvesting techniques for the communities that do not have irrigation services and practice rain-fed agriculture. Because the prospects for development of new water supplies are limited in Turkmenistan, improvements in efficiency are paramount for reliable supplies during the periods of hydrological drought in more arid conditions to be brought about by climate change. For this reason, the focus of the UNDP/AF project, placed on the development of community level water management approaches in those regions where there is significant potential for diversified non-state agriculture, horticulture and livestock management ***was well justified***;
- The ***focus on increasing the resilience of water resources for the most vulnerable and water-stressed communities in the regions with significant potential for diversified non-state agriculture, horticulture and livestock management and who are unlikely to benefit from Government's large- scale water supply and storage infrastructure.*** Despite the increasing

realization of water scarcity issues in Turkmenistan, and growing attention to and investments in water infrastructure, many communities that are not directly involved in cash crop production – and this includes the majority of communities residing in three main agro-ecological zones of Turkmenistan - are unlikely to benefit from large scale investments, experiencing increasing pressure from water shortages, as a result of which their cropping, land and water management practices are often inappropriate (resulting in land salinization, erosion and degradation of natural assets), undermining the resilience of the communities in the context of emerging climate change risks. These pressures are expected to amplify in the near future by prolonged droughts and overall aridification of the climate. Since for them the improvement of water retention and harvesting techniques are critical for long term availability of water, ***this approach was well justified;***

- ***Targeting increased resilience in 3 different agro-climatic zones in Turkmenistan (mountainous, desert and oasis)*** to allow for the design of tailored locally appropriate adaptation measures in these three areas in order to improve water delivery services that are adequate and effective under the area- specific circumstances. This was relevant as a selection criteria. However, the selection of pilot sites appears to have been more opportunistic (based on previous work in the areas), rather than based on a clear assessment of specific strategic criteria. This was noted in the MTE and was commented on during the interviews for this TE. The UNDP/AF project built upon the existing community links developed under previous development projects, including SLM. Experience of working in these regions indicated that there is a high level of motivation to participate, given the marginal support received from the Government. It was expected that the established structures and UNDP-GEF track record in these pilot regions will result in lower implementation risks, and a high degree of engagement and goodwill from local partners. This expectation materialized; moreover, that were programmatic reasons to continue working in the same locations, since this allowed to test even more innovative ideas going a step further. On the downside though, the interviews for this evaluation revealed that there is some degree of discontent with UNDP/AF choice to work in the same localities, since these communities received quite significant grant resources and ended up with much better water supply (and other) infrastructure than the neighbouring communities. This is an important consideration for UNDP's future related projects (see Chapter 5 on Lessons Learnt).

(b) ***Well identified need in a study on socioeconomic impact/cost benefit analysis (CBA)*** of v***arious measures to manage water adaptation, both on the supply and demand side***[17].

This was relevant given the prevailing practice of the choice of water management measures within the Government not driven by a resource efficiency or cost- benefit perspective: there is a perception locally that supply side measures represent a high cost response to potential water shortages in the agricultural system. Therefore, the project- financed *Socioeconomic impact study* ***was very relevant.*** It was expected that this study will allow policy makers and communities to prioritize their technology and policy choices based on clear efficiency criteria, set against the cost of potential impacts in the sector. It was also supposed to lead to the application of Integrated Assessment Modelling at a sector level; because of the late adoption of the new Water Code, this expectation did not materialize, but UNDP is planning to pursue this with the other projects

(c) ***adaptation measures - demand driven and in line with government priorities***

The community level interventions (see Annex 5) and communal management solutions for improved water efficiency and delivery services were ***in direct alignment with government priorities.*** They were also based on VCAs and consultations and following training. In the identified regions, the UNDP/AF project targeted socially vulnerable agricultural and pastoralist communities to implement concrete adaptation measures both on the demand and supply sides which is also a strong feature of the design of Component 2.[18] However:

[17] based on in-country fieldwork and a review of internationally available data, on the costs and benefits

[18] On the demand side, a series of agronomic measures aimed at rebalancing increasing water demand. For example, measures such as sand dune fixation/stabilization by planting local saksaul and other shrubs were undertaken. Such measures are

- The evaluation finds ***there to be some risk of maladaptation in the project design***. A similar concern was expressed in the MTE. By supporting the construction of new and expanded water infrastructure (particularly in Karakum, but in the other pilot regions as well, to some extent), the project is implicitly encouraging the expansion of water-dependent livelihoods, which may be further negatively impacted if water availability is reduced due to climate change.[19] Having said that, is also prudent to note that ***there were quite convincing justification of such measures*** and, in addition, the project introduced elements ***that would hopefully allow to maximise efficiency and minimise losses;***[20]
- While ***many of the adaptation measures are innovative in nature, this is not true for all the measures***. One example illustrates this: in Karakum the project supported the construction of water wells: these followed traditional design since the residents refused to have wells with solar batteries, arguing that it costs more and with the same amount of money they could have more wells of traditional type. While such approach is understandable and is driven by acute shortage of water, it would have been desirable to ensure that the residents get a chance to experience one with solar batteries.

(d) ***Clear identification of the important role of price incentives, technologies and management systems***

Establishing price incentives and ***improving technologies and management systems were correctly identified as ways to internalize climate change risks into water policies at the national level to achieve greater water use efficiency.*** This was an overall relevant approach conceptually, since a significant component of agricultural community vulnerability remains structural in nature, and requires a policy solution to change behaviour and build awareness of best practice, both among policy makers and agricultural communities. This approach was also, *inter alia*, expected to ensure that the beneficial impacts of the project can be replicated among other communities. The project plans to support the implementation of a series of legislative modifications, particularly to the new Water Code, but also to its subsidiary legislation and regulations was therefore in principle justified, but the timeframes needed were underestimated and the risks associated with the delays with the adoption were not well recognized (see below for discussion and Chapter 5 on Lessons Learnt),

The ***project design could have been stronger with***:

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essential for moisture retention and revival of vegetation cover; terracing, intercropping and planting of drought resistant local varieties will minimize water demand for agricultural practices, including pastoralism, and support sustainable livelihoods. On the supply side, AF resources were used to design and test improved water harvesting measures, internalization of climate change risks into well and irrigation canal management options and introduction of sustainable watering points for pastoralists

[19] This is partly related to the overall Turkmenistan national policies of expansion in the agriculture sector (which the project is supporting), but as an AF project, the project needs to ensure it is not supporting national policies in ways that could contribute to maladaptation

[20] ***In terms of canal activities in Sakarchaga, the focus was primarily on clearance, refurbishment and lining to improve water availability and reduce losses in irrigated oasis areas***. New construction activities were to be mostly oriented towards collectors for drainage water, recycling and reuse. The canal systems of Sakarchaga are the primary means of transport of water to the growing areas. They cannot be replaced by other technologies or mechanisms. However, losses within the canal system were high due to poor construction, maintenance and management, reducing the amount of available water and therefore land under cultivation. Cleared canals provide increased water flow and reduce evaporation and absorption rates. These activities were complemented with the introduction of management practices to reduce demand: measurement and efficient sluice gate systems, drip and spray systems were integrated where appropriate at end user level. ***In terms of wells in Karakum,*** the project sought not only to address land management and stabilisation issues around existing wells, but by extending the well infrastructure to new regions to allow herders access to a much wider rangeland (currently, livestock herders are concentrated in small areas surrounding the existing well infrastructure due to the prevailing arid conditions, leading to over grazing, land degradation and loss of pasture). Given that there are considerable volumes of underutilised ground water reserves in Turkmenistan, this was expected to counteract the impacts of degrading pasture quality and quantity, and allow desert pastoralists to maintain their livelihoods in more arid climatic conditions. ***In terms of small scale dams in the Nohur*** mountainous region, these were planned with the aim to allow for improved water infiltration into soils, capturing moisture from heavy rainfall events that would otherwise result in run-off. These were complemented by water efficiency techniques such as drip irrigation (fed by existing howdan reservoirs), soil management and terracing techniques. Together, these investments resulted in increased water capture and retention, supporting the expansion of mountain based farming even though water availability is projected to decrease.

e) Better Risk identification and mitigation strategies.

Section III.B of the ProDoc includes the project risk assessment. The risk analysis identifies only four risks, two of which are rated as *low*, and two of which are rated as *medium*. This is considered a minimum level of risk assessment for a project of this size and complexity. In the Risks Log, (a) the risk pertaining to the timely adoption of the law on WUAs is not mentioned at all; (b) the risk of "*Reluctance of decision makers to introduce progressive and differentiated water tariff and policy within project lifetime*" is assessed as "*medium*"; and (c) the only risk related to national policy revision relates to the introduction of progressive tariffs. In addition, the risk management measures are not adequately detailed and comprehensive.[21] The fact that the Inception Report of the project includes an updated risk assessment table, with nine risks identified, more than double the number identified in the project design, is another indication of the risk assessment at the project design being not completely adequate. The current risk monitoring section of the annual Project Performance Report includes 11 identified risks.

As will be discussed in Section 3.2.2, the project made a significant contribution to the adoption of the new Water Code in 2016, but the drafts of a number of accompanying Laws were not adopted as yet at the time of the evaluation and the adoption is not expected shortly. This in particular applies to the draft Law on WUA, draft Regulation on pricing mechanisms and the draft amendments to the Law of Daikhan Associations. ***It was perhaps overly optimistic to expect that that the adoption of these subsidiary legislation will happen quickly***- an assumption that underlies a number of planned outcomes, e.g. the expectation that there will be opportunities to address the lack of fiscal incentives for more efficient water use in the state sector by developing progressive tariffs, as well as introduce flexible payout mechanisms (both in Component 1; see the end of this Section for discussion). Similarly, the expectation that the draft regulation on pricing mechanisms will be adopted quickly underpins a number of planned activities. Overall, it was too ambitious that the WUAs will be established quickly also: normally this requires much longer time frame than the project duration along with private land ownership and economically sound water pricing in place. The reasoning behind this highly ambitious and overly optimistic design seems to have been the fact that the ProDoc was developed in the light of the high level of Government interest in providing a system of "*environmentally sustainable economic management*" - as expressed in Outcome 3 of the UNDAF. Already at the time of writing the ProDoc there was evidence that there are actions by the Government in line with the pronounced policy priorities, e.g. the fact that since 2010 the State had:

- ✓ allocated some land in each of the five provinces on a leasehold basis for growing maize, barley, lucerne and other forage crops with the aim to promote crop rotation and improve soil quality;
- ✓ begun to invest in high efficiency irrigation technology for water intensive crops, to include (subsoil) drip irrigation systems, mobile sprinklers and waste water drainage and recycling;
- ✓ organized an International Forum on water technologies, including for the agricultural sector, with a focus on demand side management and efficiency;
- ✓ at the meetings of the "Council of Elders[22]", in 2009 and 2010, declared the intention to forcefully pursue increased water productivity and expansion of cultivated land. This was triggered by increasing water deficits in the country in the preceding years; and.
- ✓ expressed commitments (also from the Mejlis) to support the implementation of the project regionally, with the integration of the best practices into national strategies.

a) Elaborated fall-back scenarios

The project design could have been stronger in developing fall back scenarios or to be more precise assuring that the project design is flexible enough to revert to alternative course of action in case of the planned legislation not being adopted the expected time frame. The example with the WUGs illustrates this point well, when the project shifted to supporting WUGs when it became clear that the Law in the WUAs will not pass anytime soon. While this was a good case of adaptive

[21] For example, one risk management component states that the project "includes elements which are considered realistic within given timescales"; the design of the project cannot by definition be a risk management measure for a risk identified for the project – if the design of the project addresses the risk, then the risk should not be identified as a risk for the project

[22] an ancient representing the traditional system of community leaders

management, it took time, and also went through various stages with changing implementation deign (see Section 3.2.4). More generally, tying programmatic activities to the expected adoption of laws (in this case the Law on WUAs and the anticipated regulation on improved pricing mechanisms) bears significant risks in terms of (non)achieving the expected results if the priorities of the governments or the national assemblies change and the process takes longer.

b) Better workplans

The case with the socioeconomic assessment illustrates the argument that a better workplan was needed. To inform the legislative reform it would have needed to be completed much earlier than the expected timeframe for the review by the Government of the draft legislation. At the same time, the socioeconomic assessment could have been concluded only after the adaptation measures were completed and the needed time had lapsed to allow for the benefits to materialize. The latter however where supposed to happen gradually, not at once and not all at the early stages. It was also expected that the assessments, and related capacity development efforts of local technical officers will allow policy makers to: adjust water pricing schemes; set productivity targets; and target the most disadvantaged communities. This example demonstrates that the time-bound interdependencies of various components and activities were lacking. The socioeconomic assessments are still likely to be useful however informing the future reforms, which are bound to happen given the current developments (a perception by the majority of the interviewees for this evaluation).

c) More thought -through programmatic elements to support sustainability and scaling up

As an example, the partnership with the Ministry of Agriculture and Water Resources should have been stronger, given that the long-term viability of this project results depends more on the reforms in the field of agriculture and land use reform and that agriculture is the main beneficiary sector of these technical adaptation measures.

3.1.3. Results Framework/Logframe

The Results Framework is overall of good enough quality. The main issue with it is the lack of a well elaborated workplan that would have showed interlinkages/interdependences: the example with the socioeconomic assessment vis a vis the legislative reforms was discussed in the previous Section.

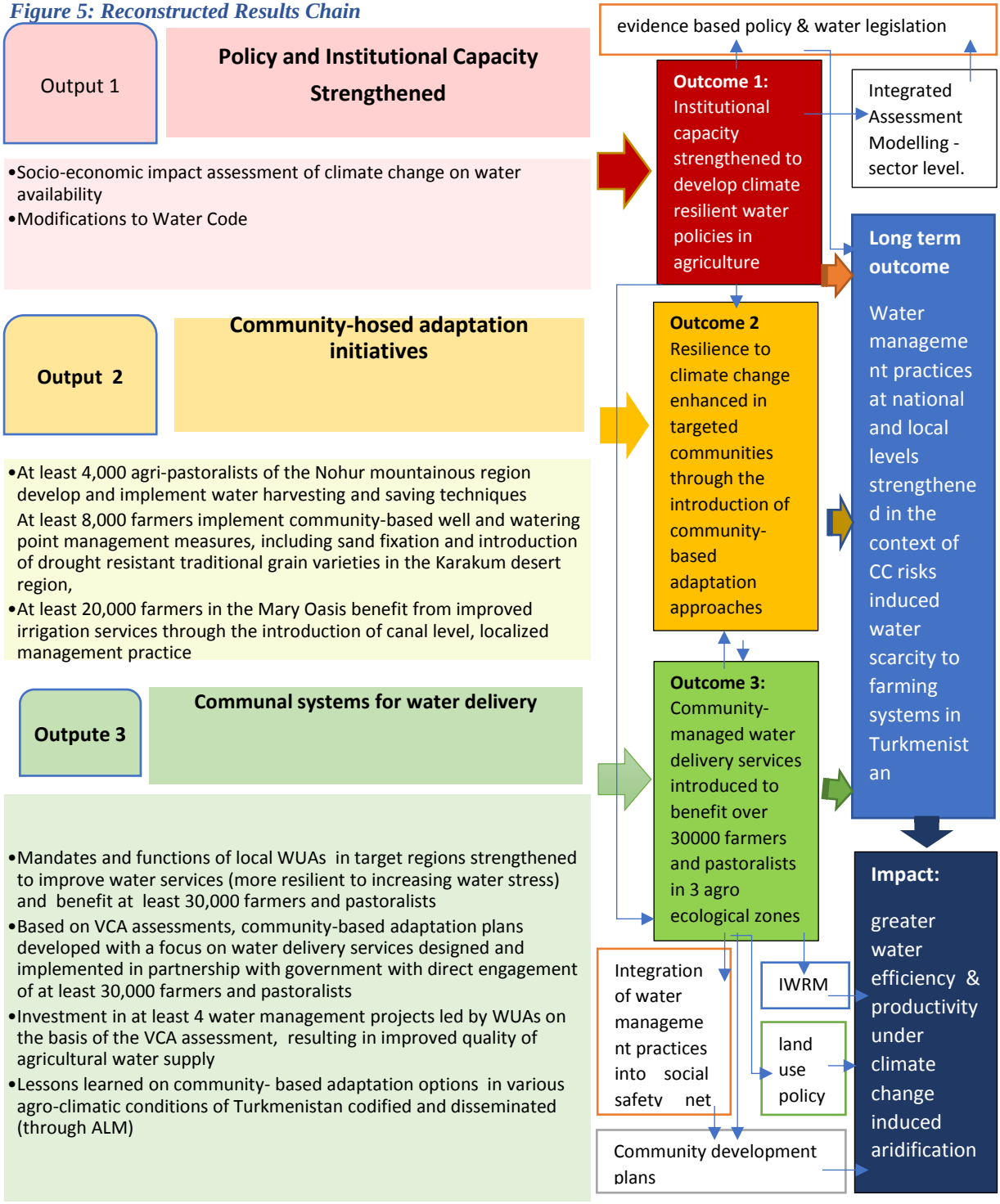
A key element of project monitoring and evaluation (M&E) design is the choice of the Results Framework indicators and targets, which should meet "SMART" criteria.[23] The indicators and targets are in the Results Framework of the project are generally in-line with SMART criteria. There are some issues with the indicators (which are mentioned in the parts when the projects progress along these indicators are discussed), e.g. the Outcome indicators being simply compilations of Output indicators. Plus, the indicators are not gender-separated. MTE (see comments in Annex 7 of the MTE) contains assessment of project results indicator-by-indicator), with recommendations. Istanbul Regional Hub was notified about the desirability of the logframe to be modified, but given that the logframe in the PPR is populated corporately, not by the CO. plus the frequent changes in the project management to follow through meant that this recommendation was not implemented.

There are various statements in the ProDoc about the expected contribution of the Project which are not captured by the Results Framework, e.g.:

- integration of communal water practices into wider social safety nets;
- linkages between water and potential reforms under the land use masterplan expected to be established; and
- application of Integrated Assessment Modelling at a sector level; etc.

[23] SMART is a mnemonic acronym, giving criteria to guide in the setting of objectives, for example in project management, employee-performance management and personal development. The letters S and M usually mean specific and measurable. Possibly the most common version has the remaining letters referring to achievable, relevant and time-bound. However, the term's inventor had a slightly different version and the letters have meant different things to different authors, as described below. Additional letters have been added by some authors.

Figure 5: Reconstructed Results Chain



3.1.4. Stakeholder Participation in Development

Although the ProDoc is not fully explicit in this regard (it is only explicit about the detailed consultation undertaken in the communities that were to participate in the UNDP/AF project in Nohur, Karakum and

Mary Oasis, which were then solicited and included as the basis for proposed measures and activities)[24], based on the data collected during the TE, it appears that stakeholder consultation in the project development phase was, overall, adequate.

3.2. PROGRESS TOWARD RESULTS: ACHIEVEMENT OF PLANNED OUTPUTS AND CONTRIBUTION TO THE ENVISIONED OUTCOMES

3.2.1. Overall

The project **results** thus far and the overall progress towards the expected outcomes is considered ***satisfactory***. Following the initial slow project start-up, significant progress and results have been achieved thereafter leading up to the TE, with another three (3) months to go before the end of the project.

The project has a total of 16 indicators, 15 of which are achieved. The remaining one (1) indicator is related to the adoption of the several draft legislation/regulations, which is not in the power of the project to affect and not likely in the very near future (based on the interviews with the local experts). The project has performed well overall, despite the multiple challenges. The key results produced as of July 2017 include:

- Multiple expert policy recommendations feeding into the adopted in 2016 ***new Water Code*** *(*80 percent of which were accepted as mentioned by the Head of the Environmental Committee of the Mejlis),
- Completed ***community climate vulnerability assessment reports,*** as well as ***community investment plans for the three pilot regions;***
- Completed ***multiple on-the-ground adaptation measures*** across the three pilot regions;
- Numerous ***community-level capacity development activities,*** related to establishing and operationalizing WUGs;
- ***Establishment of eight Water User Groups (WUGs),*** which in many respects could serve as prototypes of WUA, and at a minimum could provide useful lessons when WUAs are created in the country as part of a larger scale reform agenda;
- Concrete positive results through ***partnerships*** with other relevant projects, including: (a) cooperation with former Ministry of Water Resources for the reconstruction of the discharge drainage, financed by the state budget; and (b) cooperation with the "Zakhmet" Farmers' Association to introduce modern irrigation methods for winter wheat in 300 hectares, financed by the association.

The **effectiveness** of the project thus far is considered ***satisfactory,*** even though it is not fully clear to what extent will the project contribute to more climate-resilient water management, given that the Government institutions and the overall agricultural and water management system (including pricing structures and mechanisms) have a significant influence on the ability of communities to efficiently manage their water resources. The effectiveness of the project will ultimately depend on the extent to which (a) the project influences legislation, policy, and regulation development; (b) WUAs (in their textbook definition, rather than WUGs) become functioning and self-sustaining entities that can actually influence water use and management practices; and (c) the Government embarks on the reform agenda

[24] Section II.H of the project document, "Consultative process, including the list of stakeholders consulted, during project preparation," specifically outlines the stakeholder consultation process undertaken during the project development phase. However, the ProDoc discusses the consultation process and extent of input from the targeted pilot communities, indicating only that, "As part of proposal development, the views and requirements of the communities that are to participate in the AF project in Nohur, Karakum and Mary Oasis were solicited and included as the basis for proposed measures and activities. Local farmers, authorities and village community leaders have helped to frame the project structure," and also indicates the specific settlements where farmers were consulted, further indicating that in Sakarchaga "approximately 300 farmers" were consulted.

more forcefully and scales up the good practices. This rating is given provided on the condition that the lessons from field-level demonstration activities are documented and shared widely, beyond the pilot regions: this is included in the Recommendations and already planned by UNDP.

3.2.2. Outcome 1: Institutional capacity strengthened to develop climate resilient water policies in agriculture

Component 1 of the project aimed to address the capacity building and reform requirement at national and regional government level to promote evidence- based policy making (particularly integrating climate change projections) in that (a) water management techniques are implemented from a cost benefit perspective with equal focus on supply and demand side approaches, and (b) the value of water is recognized as a commodity through progressive water pricing. It was expected that activities will create the enabling environment that will support effective community level water management and the shift towards Integrated Water Management pursued in the Components 2 and 3, as well as inform land use policy. The results for this Component are assessed as ***Satisfactory.***

Output 1.1. Socio-economic impact of climate change on water availability costed and documented, including cost-benefit analysis of adaptation measures

- **Indicator 1.1.1**: Study on socio-economic impacts of climate change on water availability, including cost-benefit analysis of adaptation measures conducted, ***Target:*** *Study on socio-economic impacts of climate change on water availability, including cost-benefit analysis of adaptation measures conducted*

Based on the VCA, a report on socio-economic impacts of climate change risks on the local economies of three project regions was prepared with the participation of many relevant stakeholders. A preliminary cost-benefit analysis was conducted. Consultative workshops were organized to discuss the findings of the studies in all three pilot areas, as well as at the joint seminar with the participation of the representatives from the former Ministry of Water Resources, Ministry of Economy and Development and the Ministry of Nature Protection of Turkmenistan and other concerned ministries. The report was completed at the time of the TE, dated as of September 2016 (against the initial plans of extending it to 2017 to capture some late benefits, such as yields, and sales (see *Chapter 6 on Recommendations*)). It was expected that the findings from the study will:

- feed into national reporting to the UNFCCC. This was materialized since it is UNDP that assists the GoT in UNFCCC correspondence. The report has contributed also to the National Economic Program of Action on Adaption and Mitigation to Climate Change (NEPAAM) of Turkmenistan; and
- allow policy makers and communities to prioritize their technology and policy choices based on clear efficiency criteria, set against the cost of potential impacts in the sector. For this to happen, its findings needed to be documented in an accessible, tailored form and shared widely. It was anticipated that the project will produce Policy Briefs and disseminate to policy makers. The project has produced booklets but they feature only technical information on specific adaptation measures and do not have accompanying information on likely socioeconomic impacts, costs and benefits. Draft booklets of the latter type were developed for each type of technology (i.e. technical description and its socioeconomic impact), but not published as yet, due to financial constrains in 2017 (see *Chapter 6 on Recommendations*).

- **Indicator 1.1.2**: Number of water legislative acts amended based on climate change cost estimations. ***Target:*** *At least 2*

The project provided recommendations and significant inputs to the new Water Code (2016). A Working Group was established to review the draft new Water Code in view of the impacts of climate

change on water resources. The project initiated and supported discussions on various topics, related to the package of recommended amendments developed, including those related to:

- the concept of "association of water users";
- the rights of water users in relation to the establishment of WUAs / WUGs;
- the transition of water management to the basin principle and establishment of basins' councils;
- the provision of the Cabinet of Ministers the right to transfer on the balance or for the use of the interfarm collector and collector-drainage networks of WUA/WUG;
- the competences of state bodies and local authorities related to water resources management;
- the norms of the differentiated approach in determining the tariffs for water supply services;
- the determination of the legal regime of water protection zones; etc.

On October 9, 2016, the Mejlis of Turkmenistan approved ***the Law on the adoption and enforcement of the new Water Code of Turkmenistan.*** The newly adopted Water Code includes articles that enable community-based management of water resources by expanding the authority over management of the water resources to WUGs/WUAs. Among other rights, WUGs/WUAs become full-fledged participants of the agricultural sector, able to perform irrigation works and be paid. The Code also stipulates administrative and operations procedures to be put in place by the WUGs/WUAs to ensure their operations and rights. Approximately 80 percent of the recommendations of the project were adopted. Amendments were also drafted to the Law "On Pastures" and adopted by the GoT in 2015: the novelty here was on the allowance to establish *Groups of Shepherds* in order to improve pasture management and reduce degradation of pastures.

Output 1.2. A package of modifications in the water code, with particular focus on communal water management; and financial incentives for water efficiency (e.g. differentiated and progressive tariff) developed

- **Indicator 1.2.1:** Number of water regulations to introduce progressive and differentiated tariff and water delivery services under communal management, *Target - at least 2*

Several draft sub-laws have been drafted by the project experts. These are discussed below, including their status and issues.

- A ***draft a law on WUAs*** was with the Cabinet of Ministers at the time of the TE with no expectations of being adopted soon.
- A ***methodology of differentiated tariffs for services of water supply*** was developed[25] A seminar to discuss the method of calculation of the tariff for water supply services was organized jointly with the former Ministry of Water Resources, Ministry of Economy and Development and the Ministry of Nature Protection of Turkmenistan and other concerned ministries. The final documents were submitted to the state authorities for review in 2016. At the time of writing this report comments were being expected from the Ministry of Agriculture and Water Resources of Turkmenistan. The project design rightly includes an element related to addressing inadequate and perverse pricing mechanisms related to water management. Turkmenistan has a limited pricing structure for water, with charges for industrial and commercial agriculture, but with most social tariffs allowing free access to lower income users and state farmers. This results in poor and inefficient allocation mechanisms, and in a lack of incentives to undertake demand management by large portions of the agricultural community. Water pricing is an important tool for resource allocation because it provides guidance, both to users and to planners, in comparing alternative solutions. Reforms in water pricing, in particular, were expected to have strong implications on future improvements in water service delivery to more disadvantaged farmers who will benefit from improved services and cross-subsidization. To induce efficiency, the price signal must be fair and so the tariff applied must

[25] with a plan to be tested by established WUGs with results expected at the final stage of the project (the testing did not happen).

reflect actual consumption, measured in a reliable way. The proposals from the project (which were based on the review of international experience[26]) imply applying progressive (graduated pricing) and differentiated water tariff that allows cross-subsidies across water users of varied categories (e.g. farmers engaged in commercial farming versus small holder farmers on marginal lands). This evaluation (as well as the MTE) find that there was a need in a more comprehensive reform related to pricing incentives and mechanisms for water usage, with an approach that fully takes into account the inflexibility of farmers' decision-making related to water usage in areas where leaseholders are accountable for delivering centralized state orders for production, and may not have the ability to significantly modify their water management and usage. The lack of such an approach would potentially shift unsustainable pricing burdens to certain segments of the farming population, which would lead to a failed pricing system. There is another important point: until water metering is not well advanced in the country, it is premature to introduce the reforms in water pricing (this was discussed during the Project Board Meeting on January 19, 2017).

- ***The Draft Law on Amendments, additions and changes to the Law on Farmers' (daikhan),*** initiated to enhance the legislative the basis of the operation of WUGs/WUAs related to water use by WUGs/WUAs, was with the Cabinet of Ministers at the time of the TE with no expectations of being adopted soon.

Under this component it ***was also planned to explore the linkages to the national land use master plan for the agriculture sector, including the farm distribution plan.*** Working with the Ministry of Agriculture and Water Resources, as well as the Ministry of Economy, the project was supposed to explore the introduction of targets for increased water productivity and measures to achieve these. This did not happen, as at midpoint the strategy was revised and the overly. ambitious nature of this assessed. UNDP is planning the address productivity and consumption control targets with other existing or new projects.

Contribution to Outcome

- **Outcome Indicator 1.1:** Water code subsidiary laws and regulations that introduce progressive pricing policies and communal management for local water services are in place and operational**. *Targets:***
  - ✓ *A package of amendments to water code with proposed water tariff and other economic instruments developed and submitted for adoption by end of 2012.*
  - ✓ *Update of the water code to ensure explicit recognition of climate impacts on water resource availability by end of 2013.*
  - ✓ *At least 2 sets of sub- regulations developed under the Water Code to (a) implement progressive and differentiated tariffs, and b) support for water delivery services under communal management*

To start with this Outcome indicator is inadequate, as it simply repeats- and is a collection of- output indicators.

To summarize the discussion above, apart from the passage of the new Water Code and the amendments to the Law on Pastures, the other draft laws and regulations have not yet been adopted by Mejlis; they have not even passed the Government review stage. This does not reflect negatively on the project (leaving aside the overly ambitious project design issue), as it appears that the GoT has adopted a cautious course of action, taking time in pursuit of these reforms and moving slowly. As an example, the highly anticipated back in 2011 "*Integrated water and agriculture strategy"* was not adopted after all.[27] Plus, the adoption of the new Water Code was already a very important outcome to which the

[26] in particular pro-poor tariff structures being explored in South Asia, and by the UNDP's Human Rights based Water Management Programme in Central and Eastern Europe and CIS.

[27] It was expected to recognize the key role of water in delivering growth in agricultural production, productivity, and yields, and promote both supply and demand side solutions to ensure the efficient use of water within the Agro-Industrial complex.

project has contributed significantly. The new Water Code features Project recommendations on Articles #1, #4, #6, #12, #39, #40, # 60, #112. To note, the new Water Code stipulates the introduction of progressive and differentiated water tariff policy. And finally, the drafts, while not yet approved, have prepared the ground for the reforms in the respective areas, which are bound to happen sooner or later. With this work, the project has also demonstrated the linkages between various subcomponents of regulatory reform and institutional capacity building, which is also a contribution to knowledge building.

This component benefitted from the expertise exchange with specialists from Kazakhstan in the framework of development of cooperation South-South Cooperation on Climate Change was conducted.

3.2.3. Outcome 2: Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches

In the three typical agro-ecological regions - mountains, desert, and oasis – various and tailored to the specifics of these zones adaptation measures were implemented, necessary for the sustainable development of the varying sectors of the Turkmen agricultural community: from standard irrigated agriculture, to desert and mountain farming. In Nohur (mountainous area) and Sakarchaga (oasis) the total irrigated area has expanded using various hydraulic structures. In addition, in order to fully meet the drinking water needs of the local population, particularly those conducting small-oasis agriculture and animal husbandry in the desert, hydraulic structures were built which stem from traditional methods of accumulating and storing water (wells, sardoba, kaks (rain pits), dams, and reservoirs). In the mountainous region of Nohur, the system of available natural springs was restored, reservoirs were reconstructed, and the area under drip irrigation was enhanced, all of which were necessary for the growth and welfare of local communities.

Annex 5 describes adaptation measures supported in all three locations – as planned and as delivered: the comparison between these and the review of the implemented measures allows making the following conclusions:

- ***The project has overdelivered*** (see also Section 3.4.3);
- ***The level and directness of the benefit for individuals in each of the target regions varies greatly:*** see for example the discussion for Output 2.1 in Nohur later in this Section;
- ***The project has implemented important water efficiency measures, but there were also measures which support expansion of the existing systems.*** There is some risk of maladaptation as by extending irrigation infrastructure and water points the project could inadvertently incentivize the expansion of agricultural lands and livestock herds to a level that would again be on the margin of risk related to any future significant climate impacts, such as greatly reduced rainfall, or rainfall with higher seasonal variability; see however Section 3.1.2, for the justification for the choice of these measures;
- While the share of introduced innovative adaptation measures in the overall number could have been larger (see Section 5 on Lessons Learnt), ***there were important innovations/best practices*** (see **Annex 6)** introduced**,** including:
    - Methods to improve natural pastures;
    - Agrotechnical methods of phytomeliorative works on shifting sands;

In particular, the integrated strategy was expected to set out a comprehensive plan to address water and agricultural productivity. Some of the linkages included: Water Resources Management (IWRM) within agro-industrial areas; optimization modelling for agricultural production based on water use; improvements to existing irrigation systems through education and awareness; widespread introduction of drip and sprinkler irrigation technologies; development of additional reservoirs for agricultural irrigation purposes; Development and introduction of drought resistant crops; and Reuse of drainage and waste water for agricultural purposes.

- Construction of small reservoirs in the mountains;
- Using traditional technologies for irrigation of desert pastures in the Central Karakum: sardobs for drinking and watering animals and wells for watering sheep and camels;
- Using drip irrigation systems to improve the efficiency of irrigation water use;
- Restoration of juniper forests in the Central Kopetdag;
- laser levelling of irrigated land to increase crop yields;
- Using the mountain slopes for growing grapes, fruit trees and vegetables;
- Creation of pistachio gardens in Turkmenistan;
- Kak lining – water pond coating with geomembrane in the bottom and special cover on the top to avoid seepage of the water into sand and evaporation (see Error! Reference source not found.), etc

- ***A few of the measures are not directly relevant for this project***, e.g. assistance provided with regards to worm and pest control.

The overall rating for this Outcome is ***Satisfactory***

Output 2.1: At least 4,000 agri-pastoralists of the Nohur mountainous region develop and implement water harvesting and saving techniques (such as slope terracing, small rainwater collection dams, contour and stone bunds, planting pits, tillage, mulching) to improve soil moisture levels

- **Indicator 2.1.1**: water harvesting and saving techniques demonstrated/tested in targeted Nohur area. ***Target:*** *At least one water harvesting technique and saving measure*

In Nohur the project has supported the construction of small-scale dams as watering points for livestock, which generally benefit all of the communities, whose herds use the range area where the water points are, which may equal 4,000 people or greater. However, the project is also supporting specific irrigation measures and techniques, such as drip irrigation and water storage tanks, in one specific village in the region, which will have a benefit for the approximately 1,000 people in that village. Summary of concrete adaptation measures completed in Nohur is presented in **Table 8**

Table 8: Adaptation measures in Nohur under Component 2

Description of adaptation measures in Nohur	Quantity
Construction of dams	8
Repair of dams and springs	6
Reconstruction and replacement of the water pipe between the spring « Gozbash »* and a reservoir	3 km
Construction of reinforced concrete basins for water storage	3
Drilling of a new wells	2
Reconstruction and repair of the existing drip irrigation system	20 ha
Design and construction of a drip irrigation system	47 ha
Afforestation of the catchment	10 ha
Local nursery and growing seedlings of local species of trees	0.5 ha
The organization of the production of organic-compost and bio-humus	15

Output 2.2: At least 8,000 farmers implement community-based well and watering point management measures, including sand fixation and introduction of drought resistant traditional grain varieties in the Karakum desert region

- **Indicator 2.2.1:** Community based well and watering point management measures tested and demonstrated in targeted Karakum area. *Target At least two watering points*

In Karakum the project has supported the construction and repair of traditional wells and sardobs, as well as cleaning of takyrs and kaks. Other measures included sand dune fixation and afforestation measures and local nursery. An innovative method of kak lining[28] was tested in two (2) villages in Karakum (see Error! Reference source not found.). The local population declined the idea of building

[28] water pond in the desert coated with geomembrane in the bottom and special cover on the top to avoid seepage of the water into sand and evaporation constructed

wells working on solar batteries with an argument that it is expensive and for that price they can have more of the traditional ones as well as arguing that they will have issues in finding replacement parts (see Chapter 5 on Lessons Learnt). The Summary of concrete adaptation measures completed in Karakum is presented in **Table 9**.

Table 9 Adaptation measures in Karakum under Component 2

Description of adaptation measures in Karakum	Quantity
Construction of a new wells	15
Repair of the existing wells	13
Construction of new sardobs	15
Repair of existing sardobs	4
Cleaning of takyrs and kaks	4
Sand dune fixation and afforestation	10 ha
local nursery and growing seedlings of local species of trees	0.3 ha

Output 2.3. At least 20,000 farmers in the Sakarchaga area benefit from improved irrigation services through the introduction of canal level, localized management practice

- **Indicator 2.3.1:** Canal level management tested and demonstrated in targeted Sakarchaga area. ***Target****: at least one measure*

The oasis area has a broad and diversified network of irrigation canals and drainage systems. However, due to its condition, there were large losses of water for the irrigation of crops. As a result, the problems of secondary salinization and waterlogging of irrigated lands were exacerbated. The project helped to reconstruct the drainage systems, construct and repair water regulating facilities, introducing laser levelling of the fields to decrease water wastage, restoring wastelands, etc (see **Table 10**). In particular:

- 16 water control structures were manufactured and installed, and two water control structures were repaired. These facilities allow the uniform provision of water to about 2,392 ha of irrigated land. Total savings of irrigation water is expected to be more than 10 percent, taking into account the limits of irrigation water for cotton and wheat.
- The establishment of a tree nursery has facilitated activities aimed at reforestation, and landscaping around homes and schools. This contributed to a marked increase in the total area of forest plantations around irrigated fields. More than 4,500 different types of trees and shrubs, both decorative and fruit-bearing were planted.

These measures are projected to increase the income of local communities by around 20 percent. Water control structures will help to evenly and fairly distribute irrigation water among communities, which in turn will to improve water use efficiency and increase revenue for tenants and farmers in the Sakarchaga pilot region.

Table 10 Adaptation measures in Sakarchaga under Component 2

Description of adaptation measures in Sakarchaga	Quantity
Construction of water regulating devices	16
Repair of water regulating devices	2
Reconstruction and cleaning of on-farm opened collectors	31,5 km
Construction of the new open collector	5 km
Rehabilitation of earlier used abandoned lands	50 ha
Land leveling of irrigated lands with application of modern equipment	150 ha
Installation of water pump with transformer	1
local nursery and growing seedlings of local species of trees	0.3 ha

Research was conducted on determining (a) suitable volume of water to be applied by furrow on cotton, (b) suitable methods of water application via furrow; and (c) benefit of this new method, e.g. crop yield, saved water, increased fertilizer efficiency. International and national researchers were hired in 2016 and research equipment purchased (soil and water measurement devices, etc). The research started intensively in 2016 and covered not only the work in Sakarchaga, ***focussed on simulation of different***

water saving scenarios more broadly. The manager of the project (at the time) identified the need for more rigorous exercise providing background for climate change adaptation measures applied on farm and policy level. The project successfully introduced both Food and Agriculture Organization (FAO) AquaCrop and United States Department of Agriculture (USDA) NRCS SURFACE methodologies and results of simulations with two seminars (7th of October, 2016 and 13th of December 2016) on "*Development of water-saving technologies for adaptation to climate change*", under the leadership of an international expert, held for representatives of ministries, research institutions, agricultural university professors and students. [29] The participants recognized these as important and advanced tools for further research and application at national, regional and community levels. The presentation was well received. It was attended by the Head of the Science and Education Department of the Ministry of Agriculture and Water Resources, who considered that the simulation based methodology could be a very useful tool if the language is translated into Turkmen and made it accessible for the Ministry's experts (see *Chapter 6 on Recommendations*). The irrigation models and recommendations of the software were planned to be applied into practice in 2017, after the more comprehensive information has been collected from the research sites (regarding the adjustments of needed parameters and actual volumes of saved water, meanwhile maintaining the yield).[30] This is not possible however before the end of the project in September 2017 due to financial constraints (see *Section 3.5, on Sustainability* and *Chapter 6 on Recommendations*).

Contribution to Outcome

- **Outcome Indicator 2. 1:** Number of community based adaptation solutions implemented at the local level upon project closure. ***Target***
  - ✓ *At least one water harvesting technique and saving measure implemented in Nohur region to benefit 4,000 agri-pastoralists by end of 2014*
  - ✓ *At least two watering points established in Karakum region to benefit 8,000 farmers and pastoralists by end of 2014*
  - ✓ *Set of at least three agronomic measures (terracing, intercropping, saksaul planting) implemented in at least 3 communities by end of 2014*

To start with, this should not be an outcome indicator; it is an output indicator by nature. The bullet points below summarize the deliverables under Component 2 along the lines of the specified outcome indicators:

- ✓ More than one water harvesting technique (10 dams with water reservoirs) and saving measures (e.g. drip irrigations systems covering 23 ha) were implemented in Nohur project region which benefited more than 4,000 agri-pastoralists;
- ✓ More than two watering points (15 wells, 13 sardobs with 60 m^3 capacity, 4 sardobs with 500 m^3 capacity, kaks, sand dune fixation works with saksaul planting on 10 ha, etc.) established in Karakum region, benefitting10,545 farmers and pastoralists (more than the planned 8000); and
- ✓ Collector drainage irrigation improvement measures implemented in the Sakarchaga project region (cleaning of 31.5 km farm collector) was completed by the end of 2015, reclaiming 50

[29] (a) The FAO AquaCrop model for benchmarking, irrigation scheduling and for studying the effect of various soils, crop management practices, and the impact of climate change, on crop yield and water productivity was introduced and applied successfully to the project with simulation of different scenarios. It provided satisfactory results of simulating different water saving scenarios, taken the fact that only roughly half of needed for modelling site research data have been collected from cotton field site in 2016 and only initial data for winter wheat after sowing collected taken that the cropping season for winter wheat started in autumn and will end in July 2017. (b) The USDA NRCS SURFACE model for hydraulic modelling for establishing optimum parameters at the optimum irrigation efficiency has been suggested by the ISWR and successfully introduced, applied and demonstrated. Some field data needed for modelling have been already used as collected from cotton research field, and initial data for winter wheat after sowing in 2016.

[30] For the full validation of the AquaCrop simulation methodology there is a need for collecting field data for both major crops cotton and wheat during at least one full cropping season which will end for wheat in July, for cotton in September 2017. For the complete validation of the SURFACE simulation methodology there is also a need for collecting field data for both major crops cotton and wheat during at least one full cropping season which will end for wheat in July, for cotton in September 2017.

ha of abandoned lands. 16 water regulating devices were installed. 1 ha local nursery was built for the replication of fruit and other trees to reduce wind erosion, water loss from evaporation, and subsoil water level. 5 km of new drainage collector was built to reduce soil salinity and increase yields by removing subsoil salty water. All these measures are located in the territory of the Farmers Union Zahmet of Sakarchaga District. The abovementioned set of adaptation measures is estimated to benefit more than 20,000 people (with some repeated beneficiaries from various project activities) by end of the project. It is estimated be around 2145) (see later in the text in **Table 14**)

- ✓ This set of measures includes more than three agronomic measures (terracing, intercropping, saksaul planting) implemented in 3 communities

Outcome Indicator 2.2: Share of population with improved water management practices resilient to climate

- ✓ **Indicator 2.2:** Share of population with improved water management practices resilient to climate change impacts in the targeted regions. ***Target: at least 70 percent of agri-pastoralists of the Nohur, village Konegummez; at least 50% farmers in the Karakum desert region; at least 50% farmers in the Sakarchaga area, Farmers Union Zahmet.***

The implemented adaptation measures cover beneficiaries in the three pilot regions in the following proportions:

- ✓ 100 percent of agri-pastoralists of the Nohur: target village - Konegummez;
- ✓ At least 50 percent of farmers in the Karakum desert region; and
- ✓ 90 percent of farmers in the target Farmers Union Zahmet, in Sakarchaga

So, these targets are met. Field visits demonstrated that the construction was done with high quality, that this infrastructure was in demand and being used. The PPR from 2016 notes, however, that better quality materials were ideally desired which was not possible given the tendering mechanism used (see Chapter 5 on Lessons Learn). As mentioned, it will be important for the project to clearly document the *actual* economic benefits generated for the community**.** This includes also the actual number of people using better practices rather than just *having access* to these. Since not every measure was covered by the socio-economic study (it ended in 2016) and it did not cover the more mature results (yields, sales), an option of funding an update (under the new project on "*Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan* (2016-2021)" (CRL project), perhaps, needs to be considered (see Chapter 6 on Recommendations).

In addition, the project must ensure the demonstration of the value of these activities throughout the country, and focus on information and lesson sharing to catalyze greater results than for the single community targeted, which represents only a tiny fraction of the overall need (see Chapter 6 on Recommendations).

3.2.4. Outcome 3: Community-managed water delivery services introduced to benefit over 30000 farmers and pastoralists in 3 agro ecological zones

After it became clear that the draft Law on WUAs is not likely to be adopted, the project shifted to supporting the formation of WUGs, which could be viewed as prototypes of WUAs in some ways, see Error! Reference source not found..

The project sought to create a model of the public structure responsible for water management at the local level in the country. While there are questions with some of the WUGs that the project has worked with and the model overall, this has also provided a good learning that should feed into the ongoing (albeit slowly) reform processes of water sector management in rural areas. It has been observed that the presence of WUGs have improved community-based water management principles at the local level. But there are challenges related to WUGs (related to their capacity and funding) as well as of external nature (lack of water metering and adequate pricing as well as the existence of other community based

organizations engaged in water management). Only time will show whether the WUGs are viable. The results for this Outcome are assessed as ***Moderately Satisfactory***

Box 1: WUGs

WUG is a voluntary organization, the initiation of which is permitted under the Daikhan Farm (Farmers Union) structure, based on the corresponding Law. It requires a Decree of the Chairman of the Daikhan Association to be effectuated. *Regulations' on WUG Management* have been prepared by the Project Experts' Team in accordance with provisions of the Constitution, National Program of socio-economic development of Turkmenistan for the period of 2011-2030, National Strategy of Turkmenistan on Climate Change adopted in 2012, the Water Code of Turkmenistan (Article 1) and the Law of Turkmenistan 'On Farmers Unions' (2007) (Article 2; Article 3, Clause 3; Article 5, Clause 1; Article 6, Clause 3; Article 7; Clause 3; Article 8, Clauses #3, 4; Article 8-1, Clause 2. The new Water Code includes a notion of territorial WUGs - based on previously existing Brigades - 100 members on 250 hectares, with 50 percent women/men participation and basin level water management.

General Meeting of the village members on establishing Water Users Group in Bori, Karakum desert area. Nohur

Achievement of Outputs

Output 3.1: Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 30,000 farmers and pastoralists

- **Indicator 3.1.1:** Number of associations with modified mandates strengthening their institutional roles to manage and deliver water services to the target communities ***Target:*** *At least 6 associations*

The project worked with a larger number of *brigades* (that exist under daikhans) but then gradually focused on working with a total of eight (8) WUGs in the three target regions. International Consultants MetaMeta Research developed a *WUG Establishment Guidebook/Manual* (in three languages). They also trained representatives of 9 WUGs (5-day training in Ashgabat). Four trainees were also trained to become trainers themselves (two male and two female). The project has

- conducted multiple trainings in each project region to organize WUGs with clear objectives, institutional capacity and management skills, including trainings on "*Organizational Development and Management of Water User Groups*";
- supported the WUGs with: (a) developing the "*Rules of water use by WUGs in the area of irrigated agriculture, mountainous areas, and desert zones*" and methodological guides and sample forms (e.g. on membership; and on writing funding proposals to substantiate the need in specific adaptation and water supply measures; (b) opening subaccounts in the banks (as part of daikhan bank accounts); and (d) advice (e.g. helping them with the definition of the structure of particular WUGs and determining water use rules);
- provided finance (grants) for WUGs to support investments in improved efficiency and quantity of agricultural water supply for local communities. On the basis of the VCAs, the WUGs prepared proposals for project financing (see next Output), etc.

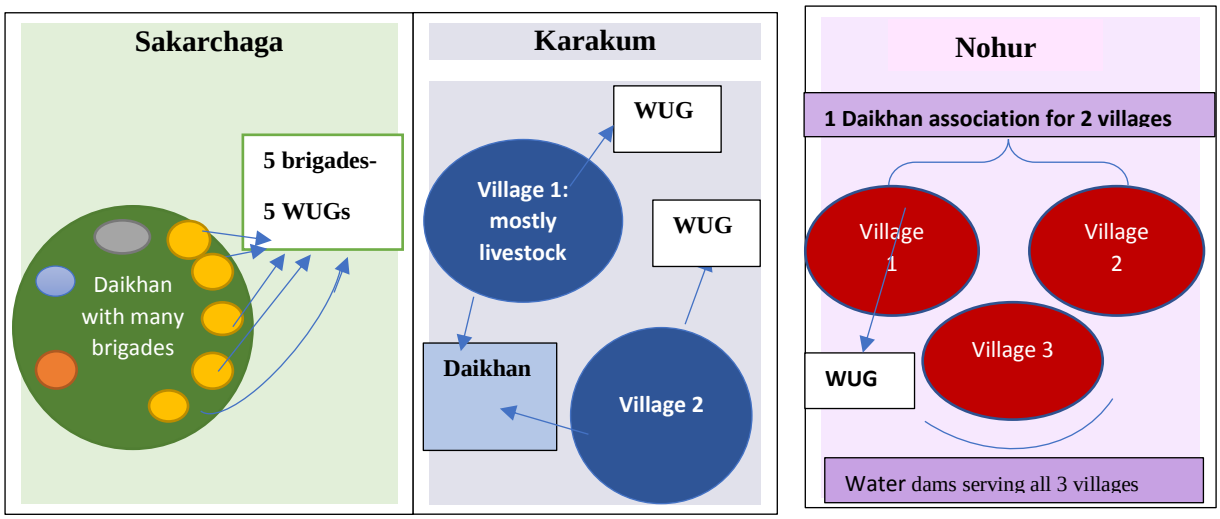
The structure of the 8 WUGs which the project supported directly and more intensively is described in **Figure 6**: the structural relations between the daikhan associations and WUGs are different in the three locations:

- one WUG in Nohur, based on 1 village (which forms a daikhan association together with the neighboring village);
- two WUGs in Karakum, each one based on 1 village, with several villages forming 1 daikhan association; and
- five WUGs in Sakarchaga on the basis of 5 brigades of the farmer (daikhan) association "Zahmet" (which has more brigades).

The progress in enhancing the capacities of these community organizations to improve water management is uneven. There is:

- greater progress in Nohur, where a strong commitment was observed among the members. Here the WUG members do not own land and irrigated farming accounts for 30 percent of the income that provides the means of subsistence for their families. Therefore, their association is more akin to a Cooperative of Agricultural Producers, with strong incentive to working together;
- some progress in Karakum, with less progress in one of the WUGs, where the residents are predominantly engaged in livestock. In Karakum, members the WUGs do not own land and irrigated agriculture is not an important component that provides means of subsistence for their families. Therefore, these WUGs will be more viable as Associations of pasture users; and
- good progress in Sakarchaga, but this is the case more recently. Initially there were challenges, as forming WUGs here involved complex community-level changes in terms of modifying the Daikhan level water management decision-making process, in coordination with the relevant government institutions. Plus, the local water management system in Sakarchaga is the most structured, as in this region the land use is almost entirely dominated by individual farmer leaseholders working in cultivated agriculture, primarily producing cotton and wheat for the state orders. Thus, it is not surprising that more significant effort was required to introduce modified systems for water management, such as the WUAs and WUGs.

Figure 6: Institutional options of the existing WUGs in relation to villages and daikhan associations



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There are other community water management structures in place which deal with the allocation of water in the community, but it is expected by the project team that the WUGs will further support the efficient use of water at the farm level in the areas under their jurisdiction. The project documents indicate plans going back to 2016 to 'upgrade' the WUGs into proper WUAs. For this to happen, however, there needs to be water measurement and adequate pricing in place, The WUAs are viable if they are established clearly on water basin principles and on irrigated land. Whether the WUGs will transform into WUAs will depend on many factors, some of which were mentioned. For now, it is important for UNDP to monitors the developments and perhaps provide some limited support to these eight (8) WUGs in the form of tools (maps, books, etc) to boost their chances of sustainability (see Chapter 6 on Recommendations).

Output 3.2: Based on VCA assessments, community-based adaptation plans with particular focus on water delivery services designed and implemented through the government's social development programmes with direct engagement of at least 30,000 farmers and pastoralists

- **Indicator 3.2.1:** Number of community plans has been budgeted through the government's social development programmes ***Target:*** *At least 6 community plans on water adaptation*

With the assistance from the project team, funding proposals were developed by the WUGs with the active participation of the local communities.[31] Key findings of the VCA assessment were translated into 11 indicators of climate risks and degrees of change in the last 20 years and 9 indicators of the impact of climatic factors on economic activity of local communities. On this basis, Action plans were developed to reduce the impact of climate risks on the life of local communities in three pilot regions, consisting of concrete measures, presented in **Table 11**. The idea was to see these "*Community based water adaptation plans for efficient, climate-resilient water development" (a)* implemented in partnership with government social development programmes with direct engagement of at least 30,000 farmers and pastoralists, and (b) integrated with and providing inputs to the *government's community-development investment plans*, to leverage further government financing for additional and expanded application of efficient water management technologies and techniques. These has not materialized however (see Chapter 6 on Recommendations). This is the critical link for the catalytic role of the project: to leverage the experience from the field-level demonstration activities into broader government investment in the water sector. There are two examples so far in Sakarchaga where government investment is being leveraged for more efficient irrigation infrastructure (e.g. financing for pivot irrigation in 350 ha), but it remains to be seen if similar financing will be leveraged in Nohur or Karakum.

Table 11 Adaptation measures/activities according to the developed investment plans for the three pilot regions were implemented.

Location	Goals of the projects
Karakum	Improvement of water supply in the territories of Farm No. 1, Bori village, Daikhan Union (D/U) Karakum, Darwaza etrap of Ahal welayat, through the repair of wells and the construction of wells, for 7 months.
	To mitigate the impacts of climate change on farms, by improving water supply in the pasture areas of Farm No. 2 D / U Karakum, the Darvaza etrap of the Akhal Welayat, through the construction of wells and sardobs, and the repair work of the wells for 7 months.
	To increase the adaptation potential for climate change by the pupils of secondary school No. 9 in the village of Mammetjar and school No. 7 of Calis etrap in the village of Chalysh of Darwaza etrap by improving the water supply and environmental conditions around the school for 4 months.
	To increase the adaptation potential for climate change in students of secondary school No. 15 in the village of Bori, D / U situation around the school for 3 months.
Nohur	To increase the adaptive potential of the inhabitants of the village of Konegummez, through the collection and rational use of water through the construction of 2 pools of 240m³ and 96 m³ in the Ata eke creek located in the eastern part of the village of Konegummez for 4 months.
	Reducing the impact of climate change and improving the adaptive capacity, by improving the socio-economic well-being of the inhabitants of the village of Konegummez, the Etrap of Bakharly, Akhal welayat, by opening a 1-year dairy processing workshop with a productivity of 1 ton / day in the village.
Sakarchaga	Provide residents of Gengeshlik "Cherkez Kol", etrap Sakracage, Mary welayat fresh water to irrigate household plots and meet household needs, by digging 2 (two) ditches with a total length of 3000 meters, for 4 months
	To increase the adaptation potential of rural residents to the effects of climate change due to the spread of experience in the field of drip irrigation in D/U "Zahmet", Gengeshlik "Cherkez Kol" of the etrap Sakarchaga, Mary Velayat by creating a demonstration and training area of 0.5 hectares (5000 M²), where drip equipment will be used for irrigation
	To mitigate the impact of climate change on farms by improving the water supply of irrigated plots and organizing the rational use of water in the GWP areas of Brigade No. 1, D / U "Zakhmet", the Sakarchagha etrap of the Mary Velayat, by

[31] These are separate, investment plans, and not 1 community plan per location. The language of the ProDoc is very vague however, so it could have been interpreter in both ways.

Location	Goals of the projects
	installing for the 4 months on the on-farm irrigation networks 8 tubular Water regulation facilities with water-measuring equipment: Q = 0,3 m³ / s - 6 pcs., Q = 0,6 m³ / s - 2 pcs.
	Improve the water supply of irrigated land by installing an electric pump with a capacity of 160 kW and a power transformer at the main watershed of the brigade No. 13 of D / U "Zakhmet", etrap Sakarchagė for 4 months.

Output 3.3: At least 6 projects funded up to a total of $400,000 through WUAs and associated community groups

- **Indicator 3.3.1:** Number and value of projects through the WUAs. ***Target:*** *At least 6 projects of a total budget of US$400,000*

Based on the identified needs, and after receiving training on proposal writing, the WUGs developed and approved plans for further implementation of adaptation measures in the settlements. The measures funded were selected from a shortlist of 12 project proposals by the WUG members with the active participation of *Archins* and heads of daikhan associations. Projects were selected on the basis of their potential to: (a) improve the delivery of water services; (b) leverage funding under government social protection or other funding mechanisms, and (c) operate sustainably over time. **Table 12** describes the potential types of projects that the WUGs were invited to submit (left hand site) and the actual (right hand site) funded initiatives. This is a second level of activity following the initial direct project-implemented adaptation measures under Outcome 2, with the difference being that under Outcome 3 funding was channelled through the WUGs as grants to let them learn fund management in practice. At the time of writing this TE report, this work was in progress. With the project closing in September 2017, the plan was to see these completed in July 2017. The funded measures complemented the main adaptation measures funded through Component 2. In addition, the WUGs received some support in the form of renovation of their office spaces: now they all have it (in Nohur it is provided free of charge by one of the WUG members, in Sakarchaga and Karakum it is provided by the local administration). The plan was to finance at least 4 projects up to a total of US$400,000 with the expected local co-funding of US$100,000. These plans materialized but the expectation that WUGs will build upon existing government social protection plans, and any emerging activities did not.

Table 12: Grants to WUGs

Guidance on typology: use of the grants	Actual
• Small scale water storage systems/dams • Canal refurbishment investments (clearance, lining, covering) • Small scale distribution networks and farm level extension • Sustainable wells and ground water extraction • Water level monitoring systems (levels and mineralization content) • Efficient sluice gates for field flooding • Communal pumping systems and efficient small-scale pumps • Water infrastructure maintenance equipment • Water drainage and capture/reuse technologies • Integrated agronomy/water management systems (including fertiliser use), land consolidation, crop diversification	**Nohur, WUG "Cheshme"**: construction of water pipeline with length of 5,250 meters from the water reservoir in the mountains to Konegummez village **Karakum: WUG "Charwa"**: Construction of innovative kak with coated geomembrane in the bottom (village Bori, 170 km away in desert) **Karakum WUG "Tebigat":** Construction of sardop and innovative kak both coated with geomembrane in the bottom and covered with special film "VapourGuard" on the top to avoid evaporation **Sakarchaga WUGs «№1», «№10», «№12», «№13», «№15» 9joint grant proposal)**: the construction of 2,450 meters long water pipe to deliver water to the "Zahmet" Farmers Association for household needs, procurement of diesel water pumps for the needs of WUG members and establishment of information resource center for the needs of WUG members

Output 3.4: Lessons learned on community-based adaptation options under various agro-climatic conditions of Turkmenistan disseminated through ALM and other networks

- **Indicator 3.4.1:** Number of lessons learned notes formulated. ***Target:*** *At least three lessons learned*

The project has been highly active in producing articles, press releases, and short summaries of the project activities, which have been published on UNDP and the ALM website.[32] At the same time, the project still needs to focus on producing highly impactful case study documents that clearly outline the experience of the project and identify key lessons for potential wider application in Turkmenistan and beyond. Against the target of 3 lessons Learnt notes:

- One publication was already produced. With the "*Applying adaptation best practices in climate change context*" the successfully tested adaptation measures under Component 2 were advocated for further replication and funding by empowered and capacitated community organizations as well as state bodies at various levels;
- As was mentioned, it was planned to produce booklets on the most innovative schemes which would combine both technical and socio-economic impact data and forecasts. These were in fact drafted, but there was no sufficient funding left in 2017 to publish. These could be the 2nd series on Lessons Learnt (See Chapter 6 on Recommendations);
- It will be very valuable if the project summarizes the experience with WUGs focusing on institutional aspects as the 3rd in the series of the Lessons Learnt, covering: legislation, regulations, training needs, procedures, factors that support their viability and those that do not; relations with state bodies and other community structures, etc. (see Chapter 6 on Recommendations). The report by the former project coordinator in Sakarchaga, who was also one of the project experts, Jumadurdiev S. (2015) "The assessment of the activities of WUGs in the pilot regions of Nohur and Karakum" could be the basis of this note but needs to be developed further.

➢ **Indicator: 3.4.2:** Number of lessons learned included in the ALM and other knowledge networks ***Target:*** *At least three lessons learned*

There was a wide-spread dissemination of project results on UNDP and ALM and other networks. There were many articles, press releases, reports, and other document, which in many ways constitute lessons learned. Only in 2016 there were 10 such articles on ALM website. The cooperation with other initiatives and participation in their activities (e.g. UNDP CRM in Turkmenistan), as well as national events (such as the National seminar dedicated to the International Environment Day on June 5, 2014 as well as participation in International Agricultural Exhibition-Fair in December 2016) provided more opportunities to share the lessons learnt. There were also exchanges of experience among the pilot regions/joint training: the representatives of four communities from other regions participated in Nohur-based trainings, for example.

The experience from the project was also shared with a group of experts and specialists from Kazakhstan (topics included *inter alia*, improvement of legal framework on sustainable pasture management and land resources, WUAs in Kazakhstan, etc.): in 2016, the Project organized an exchange visit to Kazakhstan. The aim was to share experiences around adaptation measures and for the delegates from Turkmenistan to learn about the experience with WUAs in Kazakhstan. Prior to this visit, in 2015 the Kazakhstan delegation visited UNDP/AF Project in Turkmenistan. They introduced innovative water saving/measuring tools, water disinfection techniques suitable for the stored water in sardobs; innovations related to pasture management and management of water distribution (with satellite technologies), etc. These visits were conducted in the framework of UNDP's "South-South" experience exchange programme. The group of experts from Turkmenistan included representatives from Parliament (Mejlis), Ministry of Agriculture and Water Resources, State Committee on Environmental Protection and Land Resources, local communities, WUGs, Farmers Union, and the representatives from target pilot regions from Turkmenistan

And finally, two (2) local project coordinators had a study tour to Israel and were trained at Galilee International Management Institute[33] under the "*Innovations in agriculture - Israel technologies*"

[32] http://adaptation-undp.org/projects/af-climate-resilient-farming-turkmenistan
[33] http://www.galilcol.ac.il/About_Us

programme. On return, they trained local communities in each project region. The local coordinators are now better able to promote best available international practices among local population.

Contribution to Outcome

- **Outcome Indicator 3.1:** Number of associations with improved institutional capacity to deliver water services to target communities. ***Targets***
  - ✓ *At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities by end of 2013*
  - ✓ *At least 6 community plans on water adaptation have been designed and budgeted through the government's social development programmes by end of the project*
  - ✓ *At least 6 local water adaptation investment projects have been funded through WUA and associated community organizations*
  - ✓ *At least three lessons learned notes per targeted agro-ecological system, developed and widely disseminated through knowledge networks for further replication by end of project*

At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities by end of 2013 *[NB: the other indicators are the same as output indicators discussed earlier]*

Photo 1: WUG training session

As mentioned earlier the project ended up working more closely with 8 WUGs. At least 6 of these have emerged as rather strong community groups, which have largely contributed to improved community-based water management principles at the local level. They engage in joint planning, management, decision-making and management of hydraulic structures (farm drainage collectors, local dams with water reservoirs, wells, sardobs, kaks and etc.).

> *"… for us this project was like a miracle… opened our eyes and ears… we learnt so much…"*
>
> A farmer from Nohur

The project team developed a number of training modules targeting local communities/WUG members. This included training on writing funding proposals, as mentioned. Apart from that, during 2013 - 2016 20 training sessions were conducted for them in three pilot regions of the project (Karakum, Nohur and Sakarchaga), covering, *inter alia*, the following topics (see Annex 7 for the Schedule of the training courses): adapting to climate change; organizational development of local water users; organization of water user groups and building partnerships; assessment of local needs and needs of water users in planning of local adaptation measures; establishment and management of WUGs; conflict resolution, and development of adaptation projects. Leaseholders and team leaders of brigades of daikhan associations, *shepherds chekene*, *bayars*, *mirabs*, *Archins* of *gengeshes*, heads of livestock farms, private farmers, agronomists, hydraulic engineers and other water users participated in these trainings. On average, 30 people participated in each training, around ***500 overall.*** Several key results ensued:

- increased general awareness of water users about climate change and water;
- further meetings of the participants with local population to share the knowledge gained;
- identification of leaders and activists willing to participate directly in project activities; and
- members of the WUG Management Committees
  - ✓ identifying clearly the goals, objectives, functions, and the rules of operation of the WUGs in agreement with the chairmen of the daikhan associations (these took some time in Sakarchaga);
  - ✓ working out approaches and methods of establishment of partnerships between WUGs and other Government agencies in the field of water use;
  - ✓ conducting joint assessment of local water users' needs; and

- ✓ meeting regularly to discuss issues related to adaptation activities and other issues.

It has been observed that the presence of WUGs have improved community-based water management principles at the local level. They introduce joint planning, management, decision-making and management of hydraulic structures (farm drainage collectors, local dams with water reservoirs, wells, sardobs, kaks and etc.). Thus, despite the fact that the WUGs are not legal entities, they are promising as models of associations of people interested in collective resolution of common problems acting on a voluntary basis. Based on the assessment of the WUGs' activities in the pilot regions of Nohur and Karakum, the report produced by a local consultant in 2015, noted that WUGs lacked capacity, e.g. in relation to for the formation and implementation of the common budgets and interaction of the WUGs with government agencies providing agricultural services.[34] The response by the project management was adequate in reinforcing the training program which lasts to date (training was ongoing at the time of writing this report).

- **Outcome Indicator 3.2:** % of targeted population with more secure access to water services in the face of climate change where communal management systems adopted ***Target:*** *By end of the project at least 80% of targeted population of approximately 30,000 people has access to improved water services that are resilient to drought and climate aridification*

According to UNDP Turkmenistan/AF (2016*) Assessment of Socioeconomic impacts of adaptation measures*[35] provisional estimates of costs and benefits for each activity the implementation of these measures is economically advantageous and appropriate: examples are provided in **Table 13**.

The number of direct beneficiaries (over 35420) exceeds the planned number of 32000. It is also estimated in there that the total population benefitting from the implementation of this project amounts to 69,421 persons, i.e. the initial target of 62000 people has been thus exceeded by 12 percent (see **Table 14**).[36]

Table 13 Estimates of benefits for selected adaptation measures from the projects Study on Socioeconomic impact of adaptation measures

Adaptation measure	Benefits locally	Benefits in case of national implementation/scaling up
Drip irrigation on an area of 10 hectares	110 ÷ 125 households as beneficiaries. With an average household's size at 5, the number of beneficiaries is around 550 ÷ 625 people.	The orchards and vineyards in the pilot areas cover 36 hectares If this adaptation measures are implemented on a national scale, the number of beneficiaries will be about 360 000 people, the amount of water saved will reach 720 million m^3, with the required amount of investments around US$90 million.
Cleaning collector (length 66.5 km)	Given that 1 household used approximately 3 ha, the number of households benefiting being 1108 and average household size are 5, the number of beneficiaries will exceed 5540. The financial benefits per household are estimated at US$226	At present, in Turkmenistan the cultivation area of cotton and wheat (average for the last five years) is 1440 hectares. If these adaptation activities - cleaning of collector - will be carried out on a national scale, it will benefit more than 2 million people, the required amount of investments will be around US$430 million
Construction of a new well for watering sheep	Assuming that 1 well benefits 25 households (each household having 10 sheep per household, the number of beneficiaries will exceed 125 people.	Given the fact that one well serves about 7-10 thousand hectares of pasture areas, the construction of such wells can be carried out on an area of 2-3 million hectares. For approximately 400 wells the benefits will accrue to around 20,000 people and the total cost will amount to US$4.2 million. The importance of the implementation of adaptation measures is even more enhanced by the fact that the flooding of the

[34] Jumadurdiev S. (2015) "The assessment of the activities of WUGs in the pilot regions of Nohur and Karakum"
[35] UNDP Turkmenistan/AF (2016); "Socio-economic assessment of the objectives of adaptation approaches in the context of climate change and increasing water scarcity". Prepared by: Matthew Savage, Haime Echeveria, Stanislav Aganov
[36] Ibid

area prevents further degradation of 2.5 ÷ 7.5 thousands of hectares of pasture land per 1 well.

Source: UNDP Turkmenistan/AF (2016); "Socio-economic assessment of the objectives of adaptation approaches in the context of climate change and increasing water scarcity". Prepared by: Matthew Savage, Haime Echeveria, Stanislav Aganov

Table 14: Number of beneficiaries

Project pilot area	Targets	The achieved results	Targets	The achieved results
		direct		Indirect*
Nohur	4000	9876	4000	5000
Karakum	8000	17545	8000	10000
Sakarchaga	20000	21450	18000	19000
TOTAL	**32000**	**35421**	**30000**	**34000**

Source: UNDP Turkmenistan/AF (2016); "Socio-economic assessment of the objectives of adaptation approaches in the context of climate change and increasing water scarcity". Prepared by: Matthew Savage, Haime Echeveria, Stanislav Aganov

** The number of indirect beneficiaries include students and teachers of high schools of Turkmenistan, members of research institutes of the Academy of Sciences, specialists of the State Committee on Environmental Protection and Land Resources, Ministry of Agriculture and Water Resources, who gained knowledge about adaptation activities aimed at reducing the climate change risks by attending seminars and workshops, as well as through the distribution of informative booklets and brochures among them.*

3.3. Contribution to Long term objectives

The project has made an important contribution to all 3 expected outcomes and impact despite challenges, with, in particular: (a) significant contribution to the adoption of the new Water Code; (b) innovative technical solutions for climate change adaption of agriculture; and (c) WUG model as a prototype of WUA already operating improved water management practise in selected locations

Contribution to improved water management practices at national and local levels strengthened in the context of climate change risks induced water scarcity to farming systems in Turkmenistan

The adaptation measures increased the interest and knowledge of local communities on general topics related to climate change and concepts of WUA/WUGs. In addition, a series of training events also contributed to increasing the motivation of water users to participate in decision making processes. They expressed interest in providing contribution to the project in each pilot region in a form of labour (see Section 3.4.3). In addition, during the implementation of adaptation measures representatives of local communities both men and women (60 and 40 percent respectively, on average) actively participated. Local communities formed groups of water users that participate in decision making related to water supply management locally with an adaptation angle. The WUG model has emerged as a prototype of WUA, already operating improved water management practise in selected locations, some of these WUGs, in particular those which operate in irrigated areas, have a potential to become WUAs, if the reforms in water sector and in land management progress soon. The adoption of the new Water Code, to which the project contributed significantly, is already a major step in that direction.

Contribution to greater water efficiency & productivity under climate change induced aridification

The project has made a significant contribution to introducing innovative technical solutions for climate change adaption of agriculture.

The facilities ***in Sakarchaga*** are expected to allow the uniform provision of water to about 2,392 hectares of irrigated land. Total savings of irrigation water are expected to be more than 10 percent, taking into account the limits of irrigation water for cotton and wheat. In fact, the research component introduced in Sakarchaga Project Pilot Region in 2016, argues that there could be 20 percent water saving.[37] The same research shows that an increase in yields and income of Water Users/Leaseholders

[37] Antanas Maziliauskas Consultancy Mission Report No 3, December 2016; International Water/ Irrigation Scientist – Research Expert services

by improving soil quality and preserving nutrients in the soil is possible – by around 20 percent:[38] here, the reconstruction of drip irrigation systems led to increase in income received from yields of vegetables and fruits and the use of laser levelling increased wheat yield. There is also possibility to use the saved 20 percent of water to grow additional crops, in addition to state order crops, which will increase income of farmer/leaseholders even more: part of the saved water was expected to create opportunities to deliver it to home kitchen gardens for growing vegetables, salads and fruits for additional nutrition.

The innovations introduced on Takyr (flat clay land in the middle of desert) by lining Kak (water pond, see **Error! Reference source not found.**) with HDPE Geomembrane (pilot Kak size 22m x 11m x 1.5m) ***in Karakum*** is expected to help to increase water availability by 10 times (duration), giving an opportunity to improve pasture management, reduce desertification, fix drifting sands by preserving needed amount of grass, preventing long distance walking of animals for reaching water for drinking, and many more improvements.

Construction of innovative reservoirs earthen dams in a cascade form helped to prevent destructive mud flow that could destroy the houses of the residents, livestock barns and gardens in the target village Konegummez ***in Nohur*** Pilot Region. These earthen dams helped to increase discharge of the springs allowing for the expansion of the cultivated lands near the village. After the implementation of adaptation measures the income of local communities has increased by an average of 15-20 percent. This indirectly contributed to preventing young people migrating from the village to bigger cities, according to the interviews.

The estimates cited here from the project documents were confirmed during the interviews conducted as part of this evaluation. This experience could be replicated by the Government providing sustainable solutions for climate change adaptation and benefiting agriculture and water sectors of Turkmenistan (see Chapter 6 on Recommendations).

3.4. Overall effectiveness of project management

3.4.1. Efficiency

The overall efficiency rating of the project is ***satisfactory***. The project has applied good adaptive management and has secured US$660,000 in co-financing, when zero co-financing was originally foreseen (see Section 3.4.3). The project management arrangements are working well, and the project has applied an appropriate partnership approach overall. Financial and work planning had issues, however.

Readiness and delays

Based on the approval date of December 2011, the project would have been expected to begin substantive activities in the 1st quarter of 2012, but they did not begin until the 2nd quarter of 2013 (the project had disbursed just over 5 percent of the budget by May 2013). This was mostly due to the inability to receive registration as a foreign assistance project until April 2013, which made it impossible to open a project bank account and avoid tax implications

The project passed through the project development phase relatively quickly, going from the first stages of development to approval by the AF Board in less than 18 months. This may have contributed to the apparent lack of readiness to start implementation immediately upon approval, although this may partly have been due to the fact that this was the first AF project in Turkmenistan. However, it is standard practice for AF as well as UNDP projects to be able to start implementation within a few months of

[38] Current income per farmer/water user per year from one hectare is around $200 USD, and total land allowed per leaseholder is around 2.5 hectare (WUG #13), resulting in $500 USD per year in total ($1.37 USD/day). By cultivating additional lands and also by increasing yield, target farmers/WUGs #1, #10, #12, #13, #15 were expected to be able to raise this income by 20% starting from the year 2017

final approval, even in many countries with challenging contexts, One lesson from the experience of this project is that UNDP and government partners need to prepare prior to final project approval for immediate ramp-up of human resources and any necessary formal agreements or arrangements, such as registration of the project as a foreign assistance project (see *Chapter 5 on Lessons Learnt*).
Already at midterm, due to problems with project start-up following approval, the project lagged behind by around a year compared to the originally planned schedule. The delay had not had significant negative effects on the project's ability to achieve its expected outcomes, because the on-the ground activities were rapidly being brought up to speed.[39] The project still needed an extension in 2016, in part due to external reasons (in particular the fact that the new Water Code was not adopted until 2016 and there was a lack of clarity whether the draft Law on WUAs would be adopted or not). The project was extended in 2016 by one year. After the midterm, the project continued with higher levels of disbursement, but that happened in a rather unbalanced way (see Section 3.4.3).

Adaptive management

The project has faced a variety of implementation and execution challenges, including:

- *External:* late start due to registration issues; changes in the structure of the Government in 2016; and delays in tendering processes; and
- *Internal:*
  - ✓ Initial difficulty in finding qualified project staff (related to the lack of preparedness argument, made earlier); as well as turnover in project staff, with the first project manager leaving in December 2015, and the second one leaving in December 2016. Plus, before the 1st project Manager took over, the Project Technical Specialist was leading the project. So, the project was effectively managed by four people;
  - ✓ The project had an ITA until mid- 2014. There were several task-based ITAs but not a full ITA;
  - ✓ Various procurement difficulties related to finding qualified and able vendors within planned budget lines to complete some of the field-based demonstration activities (see Chapter 5 on Lessons Learnt).
  - ✓ Design issues described in Section 3.1.2, with the third component tied to the adoption of new Water Code and Law on WUAs;
  - ✓ Difficult access to government socio-economic and climate data and to detailed agriculture and water sector investment plans (making it challenging to assess the existing level of adaptation mainstreaming); etc.

At the project inception phase no specific notable changes were made to the planned project activities. The only changes documented in the Inception Report relate to the revision of the wording for the outputs that specified a targeted number of beneficiaries to switch to percentages of the targeted population in each of the pilot areas, rather than absolute figures, but these was not followed through during the reporting.

There are several examples of good adaptive management. In particular;

- One notable adaptive management measure is the approach the project took towards implementing the WUA approach in the three pilot regions, with turning to the WUGs model. It must be mentioned that this was not a straightforward process. At mid-term, given that local farm systems in Turkmenistan are managed by farmers' associations, or "Daikhans", the project wanted to avoid setting up new civil society or community-based organizations that would overlap with Daikhan associations, so the idea then was to (a) develop the capacity of Daikhan associations to operate as WUAs, including proposing modifications to the relevant national legislation to allow transfer of water management to Daikhans; and (b) given that each Daikhan is further divided into "*brigades*" of farmers, leveraging brigades as WUGs. After midterm, this changed and at the time of the TE, the WUGs had various relations to daikhan association, as was shown in **Figure** 6. If the risk that the Law on WUAs might not

[39] MTE

pass in the project lifetime was appropriately recognized at the onset, and fallback options were developed as part of the mitigation strategy, the project would have avoided the loss of time while the appropriate model of the WUGs was sought; and

- Regarding the data availability/accessibility issues, the only practical option is to conduct project specific surveys where data is required. For example, data for VCA assessment were collected by national and international experts from the local population of the three project regions.

There were a few adjustments to project activities, which were programmatically convincing but with negative consequences on the budget. Applying internationally recognized models to assess the benefits of the selected adaptation measures was the initiative of the 2nd Project manager: this brought in the necessary international cutting edge expertise and rigor, but had consequences for the budget.

Partnership approach and stakeholder engagement

The strength of the partnership approach differed during the lifetime of the project, which is perhaps not surprising given that it was led by three (or even four- de facto) project managers. One of the project highlights has been the collaboration with the national component of the regional project funded by the UNDP Bureau for Crises Prevention and Recovery (BCPR), on Climate Risk Management (CRM). The projects shared related objectives, and worked with similar sets of stakeholders. The two projects had generated synergies and efficiencies by sharing national technical experts, and by leveraging each other's resources in the three project pilot regions. For example, publications relating to the objectives of both projects have been jointly funded, and the projects organized joint workshops. The CRM project has invested in activities directly supportive of the AF project, such as laser land-leveling, and the equipment procured for CRM project activities was subsequently used under the AF project.

Other UNDP/AF project partnerships include cooperation with the former Ministry of Water Resources for the reconstruction of the discharge drainage, financed by the state budget, and cooperation with the "Zakhmet" Farmers' Association to introduce modern irrigation methods for winter wheat in 300 hectares, financed by the association.

Research institutes, such as the Institute of Desert, Flora and Fauna and Research Institute for Water Systems Design under the (then) Ministries of Nature Protection and Water Economy were supposed to be engaged in identifying and designing technical details of the adaptation measures. This did not turn out to be the case for the Research Institutes for Water Systems Design (see the Section 3.5 on Sustainability) but the cooperation with the Institute of Desert, Flora and Fauna was strong, with several joint publications.

And finally, the project has engaged very closely with the population in the three locations.

Communication

To ensure wider outreach, UNDP Turkmenistan website, ALM website and national newspapers regularly published articles on effective implementation of new innovative adaptive technologies by the project. The project has produced a documentary film in partnership with one of the state TV companies, which was being edited at the time of the evaluation. The project has produced brochures on the adaptation measures, focusing on technical aspects, but the National Coordinator was put in charge of the dissemination and hence, during the evaluation it was not, for example, clear whether all the welayats, and more specifically their agronomists received these. The brochures and booklets were distributed however during field visits, trainings and workshops (which had representation from different welayats), as well as other events and initiatives that the project was involved (e.g. during the Agricultural Exhibition-Fair in December 2016, where project had a booth to showcase project achievements).

3.4.2. Work planning

Work planning is rated as ***moderately satisfactory*.**

The work-planning processes could have been better organized in terms of being more results-based. Given that the results framework has issues, the point here is more about striking the right balance between the programmatic needs (especially those that were not planned initially) and financial constraints. As an example, the overspending on adaptation measures, and the late introduction of the research subcomponent (with international experts involved) in the 3rd component (in 2016; a very useful initiative, but not budgeted for initially) reduced the available budget for experience sharing,

3.4.3. Finance and co-finance

Finance and co-finance is rated as ***Moderately satisfactory***

Financial planning, management and delivery of the project

The shortcomings in the financial delivery in the first half of the project appear to be primarily due to the approximately 15-month delay of the start of substantive activities, from January 2012 to April 2013. As previously discussed, there were multiple reasons behind this, relating to the performance of both the implementing and executing agencies.

Table 15 below shows the project's financial planning by components, and also indicates disbursement to date.

Table 15 Project Disbursement by Component

	AF amount planned, US$	Disbursements, US$						Total expenditure US$
		2012	2013	2014	2015	2016	2017	
Outcome 1: Institutional capacity to develop climate resilient water policies in agriculture strengthened	**350,000**	28,430	99,239	67,590	57,315	51,733	13,500	**317,807**
Outcome 2: Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches	**1,300,000**	35,570	190,420	531,363	275,548	319,552	32,000	**1,384,453**
Outcome 3: Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the three target agro-ecological zones	**800,000**	16,730	77,915	88,245	185,623	218,549	137,517	**724,579**
Monitoring and Evaluation[i]	**56,000**							
Project Coordination and Management	**250,000**	23,953	33,782	75,805	82,758	45,363	11,500	**273,161**
Total**	**2,700,000**	**104,683**	**401,356**	**763,003**	**601,244**	**635,197**	**194,517[ii]**	**2,700,000**

*Sources: Project Document for planned amount; data provided by UNDP for actual AF amounts, current as of June 15, 2017 for total and for component amounts. *The project document includes a detailed M&E budget, but M&E is not included as a stand-alone budget line in project budgets. According to the project document: "The M&E budget will be taken pro-rata from the three projects component budgets, reflecting the size of the TA." ** Up to date data on the component breakdown was not yet available at the time of analysis, thus the actual disbursements for each component do not fully total the amount indicated as total.*

Outcome 1 of the project was planned for 13 percent of the project budget, Outcome 2 was planned for 48.1 percent, and Outcome 3 was planned for 29.6 percent. Project management was budgeted at 9.3 percent of the total budget. The review of the table above indicates that there was overspending for Component 2 in the amount of US$84,453 USD. In particular, under the *budget line 72105 - Construction & Engineer works*, the planned amount was US$ 780,000, but the project actually spent

$858,300, with overspending at US$78,300. There seems to have been several results behind it, including miscommunication and increasing the expectations of the local communities[40], as well as the perceived need to keep up with the planned delivery rates in the context of the late adoption of the new Water Code. There was also overspending under the budget line *71200-involvement of International Consultants*, whereby the originally projected budget was US$122,500, but by the end of 2016 the project had spent more than US$200K, with overspending at US$77,500 (this is both under Outcome 2 and 3. Thus, the overspending on these two lines was in total US$155,800, meaning that the funding for some of the planned items was to be cut. For example, the socioeconomic impact assessment was supposed to last until the end of the project: this would be important given that some benefits would materialize only with a time lag. This plan was abandoned due to financial constraints in 2017. It will be important to complete this in this or under the new CRL project (see *Chapter 6 on Recommendations*)

The project management budget was exceeded, which is connected with the one-year extension of the project (see **Table 16**) but also due to over-hiring of project local consultants and staff (needed to oversee the expanded measures under Component 2). In fact, by 2016 the planned project management budget was already spent.

Note that the M&E budget represents 2.1 percent of the budget total, though this amount is drawn from the other components.

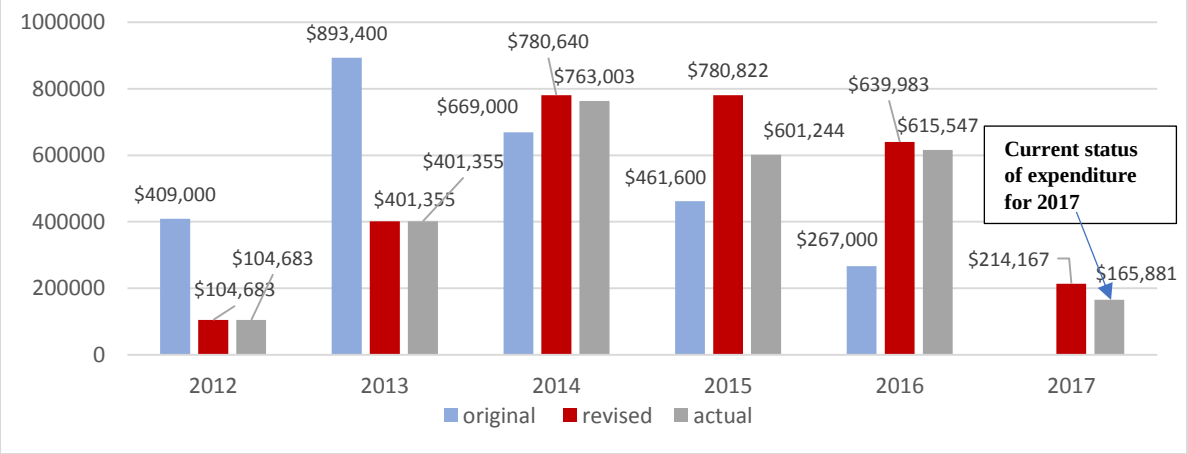
Table 16 AF Project Management Budget as a Share of Total Project Budget

Planned Project Management Budget, US$	Actual Project Management Expenditures, US$						Total, US$
	2012	2013	2014	2015	2016	2017	
250.000	23,953	33,781	75,805	82,757	44,095	13,500	273,891

Source: project budget data

Figure 7 shows AF project planned, revised and actual disbursements by year, Actual disbursements have kept up with the level of disbursements planned in the revised budget, in particular in 2016, so the issue is in the lack of planned balance to ensure that there is an appropriate level of funding for the important activities across outcomes.

Figure 7 Project Planned, Revised and Actual Budget by Year



Source: project budget data

[40] According to MTE, "due to miscommunication or insufficient communication, in 2014 the project significantly over-budgeted for Outcome 2 relative to the available resources, and this could not be easily rectified because the inaccurate budget information had been presented to national stakeholders, leading to raised expectations for results. However, UNDP, in consultation with the project stakeholders, identified budget planning measures to ultimately resolve the issue", p.31.

Cost effectiveness

Available data and resources do not allow for assessing the cost effectiveness of the project and its separate components systematically. The only aspect where there is data available concerns the adaptation measures *per se*, UNDP Turkmenistan./AF (2016) *Study on socioeconomic impacts of adaptation measures* concluded that they are cost effective based on the CBA, It could also be conjectured that the fact that a large part of legal, socioeconomic and environmental studies were conducted by a group of local experts means that the results with regards to their work were achieved in a cost effective manner.

Co-financing

At the time of the approval, the project did not include any co-financing commitments by any of the involved entities – the GoT or other partners. Match funding was to be sought where feasible from government and other funds, thereby demonstrating leverage and building WUA capacity to diversify their sources of funding. The project has in-fact benefited from co-financing contributed from various corners. Notably and impressively, co-financing has come both from government and beneficiaries at the community level. This is a positive indication of ownership by the final beneficiaries. The breakdown of this co-financing is indicated in **Table 17** below.

Table 17 Actual Co-financing Committed in Support of the Project Objective

Co-financing Type	Co-financing Source	Amount at TE	Explanation
AF MIE Agency	UNDP-funded project Climate Risk Management	US$28,000	Implementation of adaptation measures in pilot regions (garden tools sets, laser leveler equipment with scrapper, pre-works before laser planning, soil-lab and trainings)
	Community in-kind co-financing		
Private Sector	- Nohur	US$91,000	Labor
Private Sector	- Karakum	US$133,920	Labor
Private Sector	- Sakarchaga	US$54,080	Labor
National Government	Ministry of Agriculture and Water Economy	US$140,000	Reconstruction and cleaning of the inter-farm drainage channel "South" (35 km in length) in Sakarchaga project region
National Government	Ministry of Agriculture and Water Resources	US$40,000	Cleaning irrigation laterals in Sakarchaga project region
National Government	Ministry of Energy, Ministry of Agriculture and Water Resources	US $180,000	Power generator sets, potable water supply in Karakum project region
	Total	US$667,000	

Source: project budget data and estimates. The in-kind co-financing provided by the communities has been calculated based on the number of person-days of labor required for the various on-the-ground construction investments (i.e. dams, wells, sardobs, storage basin construction, etc.), multiplied by the average daily wage in Turkmenistan.

Financial controls

The financial management of the project is carried out in line with UNDP financial procedures and with the support of UNDP PIU. The first audit of the project was conducted in 2012, by the international firm Ernst & Young. The audit identified a number of financial planning issues for correction. These were diverse, but related to issues such as budget planning, over-expenditure of budget lines, staff time recording, classification of expenditures, and payment of contract benefits. UNDP provided an appropriate management response to each of the items identified, indicating that some of the items were previously known, and steps were being taken to address them. The 2nd audit was conducted in April 2014 and it did not find any irregularities except a salary that was paid to a

contractor in 2012 in the amount of US$2,622 and was recorded only in the CDR 2013 (not in 2012). So, the issues were successfully rectified.

3.4.4. Monitoring systems

Monitoring systems are rated as ***Satisfactory.*** The planned M&E activities from the ProDoc (in Section III.C on M&E) include the inception workshop and report, monthly and annual progress reports, annual meetings of the project board, independent external mid-term and final evaluations, and annual audits. The M&E Plan is assessed as meeting UNDP and AF minimum standards of good practice design for project monitoring and evaluation by explicitly stating responsible parties, budgets and timeframes for monitoring and evaluation activities. The project's M&E activities have been implemented generally in line with the plan outlined in the ProDoc. The Project Board has met at least once per year. The MTE was carried out at the approximate mid-point of the project (slightly after the originally planned mid-point for time, but prior to the mid-point for disbursement).

The M&E framework could have been of better quality (the less than adequate nature of some of the indicators was discussed in the previous Chapter), much more informative, involve key partners, stakeholders and especially beneficiaries in the target locations, e.g. tracking the actual use of the provided adaptation measures, yields and sales, etc. In the same vein, this project was ideally suited for having rigorous impact evaluation with control groups.

The use of the results framework/logframe as a management tool was at a basic level and could have been better: in that case the need to ensure the balance between disbursements between the Components could have been more apparent. Regular inspections, technical control and support for the implementation of the agreed investment activities have also been performed.

3.4.5. Risk management

Risk management is rated as ***Moderately satisfactory*****.** The risk Log in PPRs has been regularly and diligently updated every year. These revisions did not alter the fundamental issue with the under - recognition of the key risks, however.

3.4.6. Reporting

Reporting is rated as ***Satisfactory***. The project has filed regular PPRs and they are in acceptable shape and detail, but the details pertain mostly to the activities carried out and do not reflect, for example, the process by which it was decided to choose the WUG model. The part missing from the reports is related to bringing together the evidence from the research (e.g. on the socioeconomic impacts) and project reports, i.e. utilizing the figures from the studies better. The project did document however, the Lessons Learnt annually in the PPRs.

3.4.7. Management Arrangements

Management arrangements are rated as ***Satisfactory.*** Project management arrangements seem to have worked well, including the role of the PIU and the Board. The Project Board consists of the representatives of all the relevant Ministries[41], Parliament (Mejlis), the National Institute of Deserts, Flora and Fauna, local authorities and local communities. The model in the UNDP Turkmenistan CO of having a PIU, which provides administrative and financial support to multiple projects appears to be a strong one for efficient project management. However, the fact that UNDP CO had introduced a Procurement Plan according to which every tender should be initiated at least four months in advance of the starting date of planned activity might have contributed to the challenges that the project had to face, since it had to catch up on the delays after the lengthy inception phase. In addition, the fact that

[41] The Ministry of Nature Protection, Ministry of Agriculture, Ministry of Water Economy, Ministry of Finance, Ministry of Economy

the adaptation measures were funded via tenders also posed a challenge and, in hindsight, might have been better to provide grants (see Chapter 5 on Lessons Learnt)

3.4.8. Quality of implementation and execution support

The quality of Execution support and Implementation support are both rated as ***Satisfactory***

UNDP Oversight and Implementation Support

On the whole, UNDP has been strongly supportive of the project, has helped negotiate implementation issues, and has worked to solve issues that have arisen. For example, UNDP CO undertook additional efforts to address the project registration issue, when it became clear that a solution was not imminent – in January 2012 UNDP sought meetings with the relevant government bodies, and the issue was resolved by April 2013. In addition, UNDP CO played a very important role in elevating the importance of the adoption of the new Water Code. In addition, the CO has supported the project to ensure good reporting and project outreach through the UNDP website as well as project's adaptive management, and has worked through the necessary project budget revisions.

As project implementing agency, UNDP shares in the responsibility for both the project successes and results achieved, and the implementation challenges faced. This includes the start-up issues indicated earlier, as well as over-delivery under Component 2 at the expense of Component 3. One factor that may have contributed to the long timeframe for the project to get started was that there was turnover among the environment staff at the UNDP CO in the time after project approval.

Country Ownership and Execution Support

The Department for Coordination of International Programs and Projects at the State Committee on Environmental Protection and Land Resources is the official government executing partner. Based on data collected during the TE, the project appears to benefit from a good level of country ownership at the national and local levels. For example, the national parliament is represented on the Project Board (and has actually participated). The Project Board meetings contributed to better interdepartmental interaction and coordination. During the reporting period, communication and coordination with the mentioned ministries and departments have improved, thanks to the efforts of the project team. Last Project Board meeting was held on January 19, 2017 (during the PBM on January 2016, where the PB Members recommended extension of the Project for 12 months, meanwhile assessing the progress of the project as satisfactory).

Reforms are slower than expected, but this is not a sign of the lack of support to the project by the Government. Regional and national government stakeholders support the objectives of the project. The fact that UNDP in Turkmenistan, and especially the Energy and Environment unit are active part of country-driven processes on climate change is a supporting factor:

The project has drawn on a core of national experts that have formed what may be truly considered a "team", but the National Project Coordinator changed positions in early 2014, which caused some delayed approval of the 2014 project annual workplan (in May 2014). On the positive side, the GoT retained the same individual as National Project Coordinator in his new position.

3.5. Potential for Sustainability, replication and scaling up

3.5.1. Sustainability potential of the project enabling factors and risks

Sustainability potential of the project

Overall, the likelihood of Sustainability of Results is rated as ***Moderately Likely (L)/MS.*** Effective implementation of adaptation measures i***ncreased the interest and commitment of the local beneficiaries*** in the sustainable management of the adaptation measures that they are now benefitting

from. This was facilitated by their active involvement in adaptation planning and investment processes; and the fact that they are better informed now about the risks and climate vulnerability The local beneficiaries are not only more committed but also ***more able to manage the adaptation system sustainably,*** by developing workplans and implementing them**,** due to the extensive training they received and also due to the benefits of belonging to the WUGs (e.g. in the form of benefitting from the improved water distribution based on pre-agreed Annual Water Distribution Plan).

The fact that the supported adaptation measures are demand driven and the observations from the field indicate that the WUG members genuinely care about the provided measures and these ***will be looked after and maintained.*** Still there is a need for easy to use guides and manuals for the provided infrastructure (see *Chapter 6 on Recommendations*). Sand fixation measures ***helped to save houses and small gardens from drifting sands***, This and the successful implementation of the adaptation measures ***helped to create additional jobs and income, and even contribute to reduced migration to the cities***. For example, in Sakarchaga Pilot Region, the Project helped to clean drainage collectors, which contributed to reduction of salinity of soils by keeping farmers in remote areas of the Target Farmers Union Zahmet. The evidence of water saving (estimated between 10 and 20 percent) and the potential of using saved water for additional income (*NB: committed/promised by local Government to provide additional lands for growing crops with saved water*) is creating more motivation for the residents in Sakarchaga Pilot Region to stay and get engaged with agricultural production and get involved in the WUGs. Better water management helps to improve the soil productivity (nutrients not washed away, subsoil salty water not raised to the surface of soil, etc.) and prevent desertification of fertile lands in addition to increased yield and income. These are contributing factors to the argument that there will be people living in the pilot areas to maintain the provided adaptation infrastructure and they will have the interest and means to contribute financially to the maintenance.

Photo 2: Awareness raising at school in Karakum

While the fact that WUGs do not have a status of juridical entities is an institutional risk, there are provisions in the Law on Daikhan Associations which make it very difficult for a daikhan administration to dismantle them once they are formed**.** The project further strongly boosted the capacity of the WUGs by enabling them to have separate banking subaccounts at the local banks. Local ***trainers were trained to become trainers*** on WUG development. All of these are contributing factors supporting the sustainability potential of the project results in the part of the WUGs.

The Project has reached out to the State Agricultural University after S. A, Niyazov offering the students training by ISWR on FAO AquaCrop and USDA SURFACE software by using information from CLIMWAT, weather-stations and from research tools. Demonstrated models and practical training by entering data jointly with students, professors and Project expert engineers generated a big ***interest from students and teachers to use this methodology in academic research and final projects of students***.

While the need in the reform of irrigation water pricing is still there and is not addressed, there are ***important signals from the Government*** that the reforms have not stalled: there are more farmers taking land in long term lease, there are more water meters installed; etc. This instils hopes that the pricing reform will follow and that will be a supporting factor for the future sustainability of the project results.

There is ***some evidence to support the argument that daikhan administration welcome the establishment of WUGs***, as it takes away one of the burdens off their shoulder- the need to engage in distributing water, for example, while they are primarily charged with delivering the state contracts on cotton and grain. So far, the WUGs have helped to resolve the disputes between the farmers and daikhan administrations.

There is also ***some evidence to support the argument*** that the adaptation measures strengthened institutional linkages between ministries and agencies on the sustainable management of water and land resources in the context of climate change adaptation.

Risks to sustainability

Financial and economic risks: These risks to sustainability are considered ***moderately likely*****.** The financial risks to sustainability are slightly different in each of the three pilot regions, because in each region the project has supported different types of demonstration activities. In Nohur, demonstration activities include construction of small dams, and investments in modern irrigation technologies. Once constructed, dams are likely to require little maintenance. Drip irrigation systems, however, frequently need replacement parts and materials. Based on information collected during the evaluation mission, it appears that the community in Nohur has the commitment and the means to maintain the capital investments supported by the project. In the Karakum region the project is supporting wells, sardobs, and other types of traditional water management infrastructure. These require maintenance but little additional ongoing investment, although diesel generators are often used to run pumps to circulate water, which do require some financial investment for maintenance. In Sakarchaga some water control devices have been installed; these also require some maintenance but little ongoing investment. Overall, the financial risks do not seem to be high. It would have been desirable to see some financial support from Daikhan Associations in support of Operation and Maintenance (O&M) costs but no such cases have been registered so far. At the same time, given that WUGs are not separate juridical entities, the assets provided by the project are on the balance sheets of the daikhan associations, and hence, they bear at least formal responsibility of providing O&M services/cover costs. It will be important to monitor the developments to see how are these factors playing out in the future. For now, the farmers cover the O&M costs: for example, in Nohur, the WUG members reflected that they collect money regularly to pay the *Mirabs* (persons looking after the structures) and to pay for repairs if and when needed. The other aspect of financial sustainability relates to the larger picture of water management in the country, and the proposed tariff regime that the project aims to introduce. The financial risk to sustainability is whether the tariff regime (proposed by the project or whatever version of it is going to be adopted) will ultimately lead to an improved management or not.

Socio-political risks to sustainability are rated as ***moderately likely*****.** At the *level of the pilot regions* the project has secured strong engagement and participation from the local communities (with the level of this engagement stronger in some locations). The socio-political risks *at the national level* are difficult to determine, but while there are some risks, the outlook is somewhat optimistic. According to key stakeholders, the national government is committed to water sector reform, although it is likely to occur in incremental steps over a long time. The adoption of the new Water Code is already a promising step and a signal.

Institutional and Governance risks to sustainability are considered ***likely*****.** The risks related to the inadequate levels of institutional capacity in Turkmenistan's water management institutions, both at the national and sub-national levels are not specifically related to this project, but to the overall ability of the responsible authorities to effectively implement water sector policies. The fact that WUGs do not have a status of juridical entities is an institutional risk. The relationship between the WUGs and daikhan associations is not very straightforward and there could, potentially, be conflicts.

Environmental risks to sustainability are rated as ***likely***. The major environmental risk to sustainability of the project results is climate change, which is the issue the project is targeting. Nonetheless, if rainfall patterns significantly change, the benefits from the project investments particularly in Nohur and Karakum (e.g. dams, and sardobs and takyrs) could be at risk. In Sakarchaga the main and critical source of water is the Karakum canal from the Amudarya River, which is also at-risk due to climate change induced potential reduction in snow melt from the river's headwaters. On the whole however, the specific environmental risks to the sustainability of the project results are limited.

Mainstreaming

The evaluation report is required to address the extent to which the project has successfully mainstreamed such UNDP priorities as MDGs/SDGs, poverty alleviation, improved governance, and gender. The principle of UNDAF and CPAP linkages, as well as links to MDGs/SDGs have been addressed under relevance, in Section 3.1.1. The principle of disaster risk reduction and climate change

mitigation/adaptation is covered throughout this report, as it is the primary focus of the project. The remaining principles are addressed below.

Poverty-Environment Nexus / Sustainable Livelihoods: This principle is clearly addressed through the project's work to ensure that climate resilient sustainable livelihoods are supported and strengthened in each of the three pilot regions. There is a direct link to the poverty-environment nexus as communities with higher levels of poverty are less resilient to climate change. At the same time, addressing poverty requires careful attention to environmental sustainability, as some means to addressing poverty for climate change adaptation can have harmful environmental effects, which actually exacerbate the negative effects of climate change. One example is the approach of expanding watering points for livestock, which can lead to greater numbers of livestock, which can contribute to issues such as overgrazing and erosion.

Photo 3: Women are active in land cultivation in Sakarchaga and active in the WUGs

Gender Equality/Mainstreaming: The project included gender related issues among the ToRs for project local coordinators, such as "*Facilitate the establishment of a gender sensitive Community Steering Committee (CSC) ensuring that a fair process is adopted to agree the CSC members are a good representative of the community*" and "*Promote principles of equal gender representation in decision-making processes, and advocate for gender empowerment*". Strangely, the results framework does not have gender sensitive indicators, however. The revised WUG Regulations made the participation of at least 30 percent women in all three Management Committees a requirement. This helped to involve female members of the WUGs in decision making on every step. Women, were actively engaged in the implementation of all project activities. As a result, the project team noticed during meetings with them that women not only are active participants in the WUGs (especially in Sakarchaga, as was witnessed during the visit there under this evaluation) but that also concentrate their attention on improving the social conditions of life (construction of kindergartens), thus proving some link to social safety nets. They also suggested solving the problems of utilization of household waste, which is very relevant, especially in the deserts.

Capacity Development: The project is working to strengthen the capacity for efficient and effective water management in Turkmenistan at both the community and national levels. The project has held multiple community training events in each of the three pilot regions, related to climate change adaptation and water management approaches. At the national level, the project is supporting systemic capacity development, through strengthening water management policies and regulations. The project has few activities related to specific capacity development of national water management institutions, however.

Improved governance/Rights-based Approach: all project activities are considered to be implemented under a rights-based approach, as the project is respecting traditional systems and rights, while attempting to enhance the efficiency of water management.

Other related projects in place

There are several projects - by UNDP and others- in Turkmenistan currently, which could play important roles in boosting the sustainability potential of the project. These are, in particular:

- UNDP's two (2) recently started projects are very relevant in this regard. These are (see also Annex 8 for detailed description): (a) ***Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (2016-2021)*** and (b) ***Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan (2015-2021).*** The first one, in particular, is in many ways continuing the ideas promoted by the UNDP/AP project working in other regions: budget permitting it might be possible to support selected non-expensive measures emanating from the UNDP/AF project (which were curtailed due to

financial constraints). The 2nd project is also relevant, as some of the ideas which did not materialize in the current project could be promoted there, e.g. solar powered wells;

- The EU, under its newly started ***"Support to Further Sustainable Agriculture and Rural Development in Turkmenistan" (SARD III, 2016-2020)*** promotes, *inter alia*, support services, including extension services; and
- The EU project, implemented by the GIZ on Transboundary Water Management in Central Asia project (2009-2016) promotes Basin Management and Planning in Murgab Basin in Turkmenistan further, as a national component in Mary welayat [42] Among other measures, for Khanhowuz irrigation scheme, IWRM and re-use of drainage water is promoted.

3.5.2. The potential for replication and scaling up

The positive results of implemented adaptation measures in all three pilot regions have expanded the number of participating and supporting the continuation of the project in general and more specifically, replicating it elsewhere in the country. There is some evidence of the ***neighbouring Etraps*** getting interested but the concern is that the same level of interest is not as yet emanating from communities further away, pointing to the acute need in sharing the experience with all the communities: this should indeed be the role of the government through an extension service but in Turkmenistan such service is non-existent. It is important that at least UNDP, having invested significant resources into these adaptation schemes, documents all the lessons learnt as well as compiles booklets/brochures which will feature both the technical information and socioeconomic impact related data and disseminates these widely, together with the Guides developed (see *Chapter 6 on Recommendations*). Additionally, the Government could be supported in strengthening its agricultural extension services (see Chapter *6 on Recommendations)*

It is interesting to note that the ***WUGs stimulate uptake of the reforms (more people take more land in long term lease having ore water) and vice versa***: the reforms will stimulate the formation of WUAs/WUGs (e.g. to manage the local water infrastructure better, to reap the benefits arising from markets opening). This instils hope that with the reforms picking up speed, the model of the WUGs as well as the adaption measures will be replicated. As mentioned, while the need in the reform of irrigation water pricing is not addressed, there are ***important signals from the Government*** that the reforms have not stalled: there are more farmers taking land in long term lease, there are more water meters installed; etc. This instils hopes that the pricing reform will follow and that will be a supporting factor for the future replication of the project results. There are around 10 more villages similar to the Pilot Village Konegummez in Nohur; 30 similar villages in Karakum; at least 50 more etraps similar to Sakarchaga. Scaling up will mean establishment of WUGs, introduction of scientifically proven water saving irrigation techniques, by introducing income generating activities for the farmers. While it is concerning that the project plans to see budgeting of community investment plans through the government's social development programmes have not materialized as yet (see Chapter 6 on Recommendations), the government programs already have some of the similar measures, e.g. on drip irrigation. Plus, the innovative approaches were welcomed by the national ministries. This gives some confidence to claim that many innovative activities will be replicated in different regions of Turkmenistan. In addition, UNDP's current and potential projects will promote not only the Sustainability but also Replication of the project results

The gained project experience has attracted attentions not only from local communities but also from international experts. Within the framework of "South-South" cooperation representatives of Kazakhstan learned about the experience from the UNDP/AP project and shared their experience.

42 http://wecoop2.eu/sites/default/files/documents/events/presentations/8.%20Caroline%20Milow_Presentation%20on%20GIZ%20TWMCA%20Programme.pdf

These sharing of experience could potentially lead to replication of the best practices form the UNDP/AF project regionally as well.

4. CONCLUSIONS

AF resources supported improved local response mechanisms and resilience to drought induced shocks and long term aridification that results in greater water shortages in Turkmenistan. Many of these measures were innovative in nature and, if replicated throughout the country, will affect the climate change risk induced impacts significantly. A number of these measures (like drip irrigation) are already in the government programs and so that is already a good start. Now the project and UNDP need to disseminate the best practices from the project widely

The project supported the development of a prototype model of WUAs in the form of the WUGs. Eight of these proved to be strong enough to work more closely with the project. At least 6 of them are promising in terms of sustainability. They perform such roles as ensuring the equal distribution of water, monitoring the performance of the adaptation infrastructure provided as well as ensuring maintenance, dispute resolution, etc. Whether they will become WUAs will depend on the course and the speed of the reforms related to water sector (e.g. water pricing and metering) and land reform leading to private ownership. The project, through these communal management structures, introduced such service innovations as seasonal water rationing and flexible payment options. By driving water service delivery to locally appropriate and self-sustained communal systems, water services will be sustained under the conditions of a changing climate. A well-tailored hybrid of government and community managed services of water delivery may well emerge as a more cost-effective solution compared to top down, subsidized and poorly maintained service.

Through a series of regular community mobilization meetings, the WUGs identified the most pressing needs in water access and services and in cooperation with the local government planned the most acceptable solutions: these were funded by the project as grants managed by the WUGs, which strengthened their capacity in fund management, but the (co)funding from the social development programmes of the government has not happened as yet. The inclusion of water related adaptation practices into the state social programmes that engage at a similar level and scale would have been a key success factor of Component 3, a strategic opportunity to demonstrate the efficacy of integrating resilience into broader social vulnerability programmes; it still needs to be pursued in the remaining time or through other UNDP projects (see Chapter 6 on Recommendations).

The project contributed significantly to the adoption of the new Water Code. While it is disappointing that the other pieces of legislative drafts are not adopted as yet, the fact that the New Water Code is adopted means the rest will be adopted at some point and in some form, since the basic provisions are already in the new Water Code. There are already some positive signals that the reforms are gaining new impetus.

5. LESSONS LEARNT

This Section documents the lessons learned, both positive and negative, in implementing climate adaptation measures that would be relevant to the design and implementation of future projects/programmes for enhanced resilience to climate change.

10. Changing the legislative basis to recognize climate impacts is a multi-year process, and dependent upon national timetables and processes. This has to be taken into account in the design of similar projects;
11. Water management approaches have to be carefully adapted to the local context. Project experience has shown, for example, that the WUG approach works differently in the three project pilot areas;

12. Longer term awareness raising is needed among the population to increase the appetite for innovative technologies and break the understandable inertia leading to preference of traditional technologies. It can be beneficial to prioritize awareness raising and education activities earlier in the project implementation period, to build community stakeholder buy-in and awareness for adaptation measures;
13. International best practice is important for agricultural systems and well worth to get due consideration at the project design stage;
14. Projects like this lend themselves very well to applying rigorous impact evaluation (with control groups) and such opportunities must be seized to be able to argue for the benefits with rigor that will stand scientific scrutiny;
15. UNDP and government partners need to prepare prior to final project approval for immediate ramp-up of human-resources and any necessary formal agreements or arrangements (such as registration of the project as a foreign assistance project). It is also important to acknowledge that time and resources need to be spend to obtain buy-ins from local authorities and local communities to ensure smooth implementation of the project;
16. Community level adaptation measures (pasture wells, sustainable agriculture, soil fixation, etc.) are better pursued through grant arrangements than through commercial tenders. Grants have shown to be more efficient in similar projects. They also help to catalyze stakeholder ownership by the communities themselves, since they are directly involved in carrying out the physical work, and contributing their own resources for co-financing;
17. The project proposals need have adequate workplans with elaborate workflows highlighting interdependences, and the project staff need to get advanced training in project management. This applies also to applying a more prudent financial approach to programmatic management; and
18. Care is needed to be exercised by UNDP when focusing on the same locations through several projects, especially if these involve extensive grant funded infrastructure measures. There is a risk of affecting the relations between neighboring villages, among others.

6. RECOMMENDATIONS

For **UNDP:**

- ✓ **Recommendation 1**: Publish and disseminate case studies on the most innovative adaptation measures, combining the technical descriptions and socioeconomic impact forecast;
- ✓ **Recommendation 2:** Publish and disseminate easy- to- use instructions on the Operation and management (O&M) of the adaptation measures introduced to the communities;
- ✓ **Recommendation 3:** Develop, publish and disseminate Lessons Learnt: one was published on technical side of the adaptation measures; the case studies (combining the technical and socioeconomic impact related information in separate brochures, as in Recommendation No2) could be the 2nd; and the 3rd one should be on the institutional aspects of the WUGs;
- ✓ **Recommendation 4:** Finalize the editing of the video documentary about the project and arrange the airing;
- ✓ **Recommendation 5:** Conduct presentation(s) (could be in a format of one well-structured conference) ensuring the participation of the stakeholders not yet actively engaged, especially from the welayats not covered by the project;
- ✓ **Recommendation 6:** Conduct high-level discussions with the Government over linking the project results and national investment plans, field trips, and alike;
- ✓ **Recommendation 7 (**a) Complete the last round of the research initiated in Sakarchaga (b) initiate the last round of the socioeconomic impact analysis to capture late benefits and (c) complete the training on the two models (FAO and USDA) for the engaged parties: carry out these by linking these to the UNDP's new CRL project. Transfer the equipment purchased for the research in Sakarchaga to the CRL project;
- ✓ **Recommendation 8:** Translate the manuals for simulation exercises based on FAO AquaCrop and USDA NRCS SURFACE methodologies into Turkmen language, as was planned and hand

it over to the Ministry of Agriculture and Water Resources, as well as the State Agrarian University. Carry out this recommendation by linking it to the new CRL project;

- ✓ **Recommendation 9:** Strengthen the information base (resource centres) for the pilot WUGs – to increase their chances of sustainable operations. Monitor the developments around the WUGs. Carry out this recommendation by linking it to the new CRL project;
- ✓ **Recommendation 10:** Utilize in full the opportunities for additional partnerships with the: (a) EU, GIZ, WB: to support the government in strengthening the agricultural extension services; (b) GIZ project on water basin management in Mary region and (c) FAO – the newly starting regional project on climate change adaptation, to share the accumulated experience and best practices
- ✓ **Recommendation 11:** Seek further funding from the international organizations to support transformative national and sectoral policy reform in state crops sector for scaling-up climate-resilient agriculture, and improved enforcement of water and land use regulations, coupled with accelerated wide-scale dissemination of water saving and resilient farming technologies and practices among smallholder farmers and state-run collective associations.

For the **Government of Turkmenistan**

- ✓ **Recommendation 12:** Link the project results with the national investment plans, field trips, and alike, promoting replication;
- ✓ **Recommendation 13:** Analyze the experience with the WUGs and take into account in the plans to introduce WUAs in Turkmenistan
- ✓ **Recommendation 14:** Formulate clear and time bound program for reforming rural water sector management linking it to land reform

ANNEXES

1. Terms of reference

Terms of Reference

Project Title:	UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "
Location:	Home based with one mission to Turkmenistan
Type of Contract:	Individual Contract (IC)
Position:	International Terminal Evaluator
Starting Date:	**15 May 2017**
End Date:	**14 July 2017**

INTRODUCTION

In accordance with the UNDP and AF M&E policies and procedures, a Terminal Evaluation (TE) of the full-size project "Addressing climate change risks to farming systems in Turkmenistan at national and community level" is to be undertaken upon completion of implementation. The project started on 08.12.2011 and following no-cost extension, ends on 30.09.2017. This Terms of Reference (ToR) sets out the expectations for this TE. ***This ToR also sets out the scope of work, deliverables, timeframe and payment terms for International Evaluator, Team Leader.***

The essentials of the project to be evaluated are as follows:

Project Title:	**"Addressing climate change risks to farming systems in Turkmenistan at national and community level"**			
UNDP Project ID:	00059797	Project financing	at endorsement (Million US$)	at TE (Million US$)
ATLAS Project ID:	00074953	AF financing:	US$ 2,700,000	
Country:	Turkmenistan	IA/EA own:		
Region:	Eastern Europe and Central Asia (ECA)	Government:		
Focal Area:	Ashgabat	Other (UNDP):	US$ 93,105	
		Total co-financing:		
Executing Agency:	The State Committee of Turkmenistan on Environment Protection and Land resources	Total Project Cost in cash	US$ 2,793,105	
Other Partners involved:	Other government ministries relevant for water management; Pilot project sites.	Project Document Signature (date project began):		December 8, 2011
			Planned closing date: September 2016	Revised closing date: September 2017

PROJECT BACKGROUND AND OBJECTIVES

The project objective is to strengthen water management practices at both local and national levels in response to climate change-induced water scarcity risks that are increasingly affecting farming systems in Turkmenistan.

The project is comprised of three main components:

1. Institutional capacity to develop climate resilient water policies in agriculture strengthened;
2. Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches;
3. Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the three target agro-ecological zones.

3 outcomes contribute to these objectives:

Project Components	**Expected Concrete Outputs**	**Expected Outcomes**
1. Institutional capacity to develop climate resilient water policies in agriculture strengthened	1.1. Socio-economic impact of climate change on water availability costed and documented, including cost-benefit analysis of adaptation measures 1.2. A package of modifications in the water code, with particular focus on communal water management; and financial incentives for water efficiency (e.g. differentiated and progressive tariff)	A package of amendments to water code with proposed water tariff and other economic instruments developed and submitted for adoption; Update of the water code to ensure explicit recognition of on climate impacts on water resource availability.

2. Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches	2.1. At least 4,000 agri-pastoralists of the Nohur mountainous region develop and implement water harvesting and saving techniques (such as slope terracing, small rainwater collection dams, contour and stone bunds, planting pits, tillage, mulching) to improve soil moisture levels; 2.2. At least 8,000 farmers implement community-based well and watering point management measures, including sand fixation and introduction of drought resistant traditional grain varieties in the Karakum desert region; 2.3. At least 20,000 farmers in the Mary Oasis benefit from improved irrigation services through the introduction of canal level, localized management practice;	At least one water harvesting technique and saving measures implemented in Nohur region to benefit 4,000 agri-pastoralists; At least two watering points established in Karakum region to benefit 8,000 farmers and pastoralists; Canal level irrigation improvement measures implemented in the Sakar-Chaga region to benefit 20,000 people.
3. Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the three target agro-ecological zones	3.1. Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 30,000 farmers and pastoralists; 3.2. Based on VCA assessments, community-based adaptation plans with particular focus on water delivery services designed and implemented through the government's social development programmes with direct engagement of at least 30,000 farmers and pastoralists; 3.3. At least 4 projects funded up to a total of $400,000 through WUAs and associated community groups; 3.4. Lessons learned on community-based adaptation options under various agro-climatic conditions of Turkmenistan disseminated through ALM and other networks.	At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities; At least 6 community plans on water adaptation have been designed and budgeted through the government's social development programmes; At least 4 local water adaptation investment projects have been funded through WUA and associated community organizations.

TERMINAL EVALUATION APPROACH AND METHOD

The TE will be conducted according to the guidance, rules and procedures reflected in the 'UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects' (2012), henceforth referred to as 'TE Guidance'.[43] An overall approach and method for conducting project terminal evaluations of UNDP supported AF financed projects has developed over time. The evaluator is expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact,** as defined and explained in the TE Guidance. A set of questions covering each of these criteria will be provided to the selected evaluator. The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the AF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders.

The objective of TE is to provide a comprehensive and systematic account of the performance of project results by assessing its project design, process of implementation, achievements against project objectives endorsed by the UNDP and AF including any agreed changes in the objectives during project implementation and any other results, and draw lessons learned that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming. The project performance will be measured based on the indicators of the project's logical framework **included in this ToR as Annex 3**.

TE has three complementary purposes:

- To evaluate results and impacts, relevance, effectiveness and sustainability
- To suggest recommendations for replication of the project successes
- To document, provide feedback on and disseminate lessons learned

More specifically, the evaluation should assess:

Project concept and design

Assess the project concept and design. Review the problem addressed by the project and the project strategy, encompassing an assessment of the appropriateness of the objectives, planned outputs, activities and inputs as compared to cost-effective alternatives. The executing modality and managerial arrangements should also be judged. Assess the relevance of indicators and review the work plan, planned duration and budget of the project.

Implementation

The evaluation will assess the implementation of the project in terms of quality and timeliness of inputs and efficiency and effectiveness of activities carried out. Also, the effectiveness of management as well as the quality and timeliness of monitoring and backstopping by all parties to the project should be evaluated. In particular, the evaluation is to assess the Project team's use of adaptive management in project implementation.

Project outputs, outcomes, impact and lessons learned

The evaluation will assess the outputs, outcomes and impact achieved by the project as well as the sustainability of project results. This should encompass an assessment of the achievement of the immediate objectives and the contribution to attaining

[43] The guidance document for UNDP-supported GEF financed projects can be used for AF financed projects as well. The document is available via this link.

the overall objective of the project. The evaluation should also assess the extent to which the implementation of the project has been inclusive of relevant stakeholders and to which it has been able to create collaboration between different partners. The evaluation will also examine if the project has had significant unexpected effects, whether of beneficial or detrimental character.

Ratings must be provided on the following performance criteria:

- Monitoring and Evaluation design at entry
- Monitoring and Evaluation Plan Implementation
- Overall quality of M&E
- Relevance
- Effectiveness
- Efficiency
- Overall Project Outcome Rating
- Quality of UNDP Implementation – Implementing Agency (IA)
- Quality of Execution - Executing Agency (EA)
- Overall quality of Implementation / Execution
- Sustainability of Financial resources
- Socio-political Sustainability
- Institutional framework and governance sustainability
- Environmental sustainability
- Overall likelihood of sustainability

The completed Required Ratings table (as found in the TE Guidance) must be included in the evaluation executive summary. The obligatory rating scales can be found in the TE Guidance.

OBJECTIVES OF TERMINAL EVALUATION

The TE must provide evidence based information that is credible, reliable and useful. The evaluation is expected to follow a participatory and consultative approach ensuring close engagement with Government Counterparts, including project three (3) target pilot regions, UNDP Country Office, Project Team, UNDP-AF Regional Technical Adviser based in the region and key stakeholders.

Engagement of stakeholders is an important aspect of TE. Stakeholder involvement should include interviews with stakeholders who have project responsibilities, executing agencies, senior officials and task team/component leaders, key experts and consultants in the subject area, Project Board, project stakeholders, local government and CSOs, etc. Additionally, the TE should include field missions to project sites in three (3) pilot regions – Nohur (mountainous area), Karakum (desert area) and Sakarchaga (oasis area).

Interviews will be held with the following organizations and individuals as a minimum:

1. UNDP Country Office management and relevant Programme staff
2. UNDP/AF project staff;
3. Implementing Partner (The State Committee of Turkmenistan on Environment Protection and Land resources)
4. National Project Coordinator and relevant staff of the National Institute of Deserts, Flora and Fauna
5. Project Board members and partners: Ministry of Agriculture and Water economy of Turkmenistan; project pilot regions.

TE should include evaluation of all relevant sources of information, such as the project document, project reports – including Annual PPRs, AF Tracking Tools, project budget revisions, progress reports, project files, national strategic and legal documents, Mid-term Evaluation (MTE) report and any other materials that the team considers useful for this evidence-based evaluation. A list of documents that the project team and UNDP Country Office will provide for review is **included in this ToR in Annex 1**.

The TE report shall be a separate document which will contain the recommendations and conclusions. Respective Report template is **included in this ToR as Annex 2**.

The report will be intended to meet the needs of all the related parties (AF, UNDP, project partners, local communities and other related parties in Turkmenistan and foreign countries).

DETAILED SCOPE OF THE TERMINAL EVALUATION

The TE will assess the following four categories of project progress. Each category is required to be rated overall progress using a six-point rating scale **outlined below and included in this ToR under Rating section**.

i. Project Strategy

Project design:

- Evaluate the problem addressed by the project and the underlying assumptions. Review the effect of any incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document.

- Evaluate the relevance of the project strategy and assess whether it provides the most effective route towards expected/intended results.
- Evaluate how the project addressed country priorities.
- Evaluate the extent to which relevant gender issues were raised in the project design.
- Evaluate if there are major areas of concern.

Results Framework/Logframe:
- Evaluate if the project's objectives and outcomes or components are clear, practical, and feasible within its time frame.
- Examine if progress so far has led to catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework.
- Ensure broader development and gender aspects of the project are being monitored effectively.

ii. Progress Towards Results and Impacts

Progress Towards Outcomes Analysis:
- Evaluate the outputs and progress toward outcomes achieved so far and the contribution to attaining the overall objective of the project
- Examine whether progress so far has led to potentially adverse environmental and/or social impacts/risks that could threaten the sustainability of the project outcomes. Evaluate if these risks were managed, mitigated, minimized or offset.
- Evaluate the extent to which the implementation of the project has been inclusive of relevant stakeholders and to which it has been able to create collaboration between different partners, and how the different needs of male and female stakeholders have been considered. Identify opportunities for stronger substantive partnerships

iii. Project Implementation and Adaptive Management

Management Arrangements:
- Review and evaluate overall effectiveness of project management as outlined in the Project Document.
- Review and evaluate the quality of execution of the Executing Agency/Implementing Partner(s).
- Review and evaluate the quality of support provided by the AF Partner Agency (UNDP).

Work Planning:
- Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved.
- Are work-planning processes results-based?
- Examine the use of the project's results framework/logframe as a management tool and review any changes made to it since project start. Ensure any revisions meet UNDP-AF requirements and evaluate the impact of the revised approach on project management

Finance and co-finance:
- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions.
- Review and evaluate the changes to fund allocations as a result of budget revisions and assess the appropriateness and relevance of such revisions.
- Evaluate if project budget and duration were planned in cost effective way.
- Review and evaluate if the project had appropriate financial controls, including reporting and planning, that allow management to make informed decisions regarding the budget and allow for timely flow of funds.
- Complete the co-financing monitoring table **included in this ToR in Annex 1.**

Mainstreaming:
- UNDP supported projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including SDGs, poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

Project-level Monitoring and Evaluation Systems:
- Evaluate the monitoring tools currently being used: Do they provide the necessary information? Do they involve key partners? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required?
- Ensure that the monitoring system, including performance indicators meet UNDP-AF minimum requirements. Develop SMART indicators as necessary.
- Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?

Stakeholder Engagement:
- Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?
- Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?

- Participation and public awareness: To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?

Reporting:
- Assess how adaptive management changes have been reported by the project management and shared with the Project Board.
- Assess how well the Project Team and partners undertake and fulfil AF reporting requirements (i.e. how have they addressed poorly-rated PPRs, if applicable)
- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

Communications:
- Review and evaluate project communication with stakeholders. Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?
- Review and evaluate external project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)
- Evaluate and summarize the project's progress towards results in terms of contribution to sustainable development benefits, as well as global environmental benefits.

iv. Sustainability, replication and scaling up
- Validate whether the risks identified in the Project Document, PPRs, and the ATLAS Risk Management Module are the most important and whether the risk ratings applied are appropriate and up to date. If not, explain why. Describe the replication and scaling up potential of the project.
- In addition, assess the following risks to sustainability:

Financial risks to sustainability:
- What is the likelihood of financial and economic resources not being available once the AF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?

Socio-economic risks to sustainability:
- Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public/stakeholder awareness in support of the long-term objectives of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?

Institutional Framework and Governance risks to sustainability:
- Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? While assessing this parameter, also consider if the required systems/mechanisms for accountability, transparency, and technical knowledge transfer are in place.

Environmental risks to sustainability:
- Are there any environmental risks that may jeopardize sustenance of project outcomes?

Conclusions, Lessons Learned & Recommendations

The TE Report must include section setting out the TE's evidence-based conclusions, in light of the findings. Recommendations should be succinct suggestions for critical intervention that are specific, measurable, achievable, and relevant. Recommendations should include aspects of enhanced sustainability, national ownership and exit strategy. Analysis of the lessons learned is an important part of the terminal evaluation report. The lessons learned section/annex should analyze the lessons learned and best practices generated by the project, including but not limited to project's contribution to SDGs, gender equality, replication and scaling up potential.

Rating

The TE Report should include ratings of the project's results and brief descriptions of the associated achievements in a TE Ratings & Achievement Summary Table in the Executive Summary of the TE report. Following rating scales should be used:

Ratings for Progress Towards Results: (one rating for each outcome and for the objective)		
6	Highly Satisfactory (HS)	The objective/outcome is achieved or exceeds all its end-of-project targets, without major shortcomings. The progress towards the objective/outcome can be presented as "good practice".
5	Satisfactory (S)	The objective/outcome is achieved most of its end-of-project targets, with only minor shortcomings.
4	Moderately Satisfactory (MS)	The objective/outcome is achieved most of its end-of-project targets but with significant shortcomings.
3	Moderately Unsatisfactory (HU)	The objective/outcome is achieved of its end-of-project targets with major shortcomings.
2	Unsatisfactory (U)	The objective/outcome is not achieved of most of its end-of-project targets.
1	Highly Unsatisfactory (HU)	The objective/outcome has failed to achieve any of its end-of-project targets.

Ratings for Project Implementation & Adaptive Management: (one overall rating)		
6	Highly Satisfactory (HS)	Implementation of all three components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation and adaptive management. The project can be presented as "good practice".
5	Satisfactory (S)	Implementation of most of the three components is leading to efficient and effective project implementation and adaptive management except for only few shortcomings.
4	Moderately Satisfactory (MS)	Implementation of some of the three components is leading to efficient and effective project implementation and adaptive management, with some components' significant shortcomings.
3	Moderately Unsatisfactory (MU)	Implementation of some of the three components is not leading to efficient and effective project implementation and adaptive management, with most components' shortcomings.
2	Unsatisfactory (U)	Implementation of most of the three components is not leading to efficient and effective project implementation and adaptive management.
1	Highly Unsatisfactory (HU)	Implementation of none of the three components is leading to efficient and effective project implementation and adaptive management.

Ratings for Sustainability: (one overall rating)		
4	Likely (L)	Negligible risks to sustainability, with key outcomes on track to be achieved by the project's closure and expected to continue into the foreseeable future
3	Moderately Likely (ML)	Moderate risks, but expectations that at least some outcomes will be sustained due to the progress towards results on outcomes at the Midterm Evaluation
2	Moderately Unlikely (MU)	Significant risk that key outcomes will not carry on after project closure, although some outputs and activities should carry on
1	Unlikely (U)	Severe risks that project outcomes as well as key outputs will not be sustained

Detailed methodology and work plan should be developed during the preparatory phase of the TE. The TE tools and techniques may include, but not limited to:

- Desk review;
- Interviews with major stakeholders, including UNDP/AF project implementing and executing agencies, government representatives, etc.
- Field visits to the project sites;
- Questionnaires;
- Participatory techniques and other approaches for gathering and analysis of data.

TEAM COMPOSITION FOR TERMINAL EVALUATION

TE Evaluation will be undertaken and led by one independent International Evaluator and will be assisted by UNDP/AF project staff. The International Evaluator will not have participated in the project preparation and/or implementation, and should not have conflict of interest with project related activities.

DUTIES, REQUIRED QUALIFICATION AND COMPETENCIES FOR TEAM LEADER

Duties and Responsibilities:

- Desk review of documents, development of draft methodology, detailed work plan and TE outline;
- Briefing with UNDP CO, agreement on the methodology, scope and outline of the TE report;
- Interviews with project implementing partner (executing agency), relevant Government, NGO and donor representatives, Project CTA and UNDP/AF Regional Technical Advisor;
- Field visit to the project pilot regions/project sites and interviews with respective local authority representatives;
- Debriefing with UNDP CO;
- Development and submission of the first TE report draft;
- Finalization and submission of the final TE report through incorporating suggestions received on the draft report;

Required Qualification and Competencies:

- A Master's degree or equivalent in Natural Resource Management, Natural Sciences, Environmental Economics/Policy and/or other closely related field;
- Previous experience with result-based management evaluation methodologies;
- Experience applying SMART indicators and reconstructing or validating baseline scenarios;
- Competence in adaptive management, as applied to conservation or natural resource management;
- Work experience in relevant technical areas for at least seven (7) years;
- Experience of working in CIS region will be an asset;
- Project evaluation/review experiences within United Nations system will be an asset;
- Experience working with the AF and/or evaluations will be an asset;
- Excellent communication skills;
- Demonstrable analytical skills;
- Fluency in English both written and spoken and good technical writing skills. Good knowledge of Russian is an asset.

TIMEFRAME FOR TERMINAL EVALUATION

The total duration of the TE should be from 15 May 2017 to 14 July 2017. Determined evaluation period for International Evaluator includes in total 25 work days, including one (1) mission with up to 9 travel days to Turkmenistan. Timeframe should be according to the following plan:

Activity	Evaluation Timeframe and Number of Work Days for Team Leader
Preparatory Phase	(15 May – 20 May 2017 period) (3 work days)
Evaluation mission and debriefing	(21 May – 30 May 2017 period) (7 work days with up to 9 Travel days)
Draft evaluation report	(31 May - 13 June 2017) (10 work days)
Finalization of final report	(no later than 14 July 2017) (5 work days)

IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP Country Office (UNDP CO) in Ashgabat, Turkmenistan. The UNDP CO will contract the consultants and ensure the timely provision of travel costs and travel arrangements within the country for the evaluation team. The project team will be responsible for liaising with the evaluation team to set up stakeholder interviews, arrange field visits with missions to Ashgabat, Turkmenistan including the following target project pilot regions: Nohur (mountainous) site, Karakum (desert) site and Sakarchage (oasis) site.

TERMINAL EVALUATION DELIVERABLES FOR EVALUATOR

Deliverable	Content	Timing	Responsibilities
Inception Report	clarifies timing and method of evaluation	No later than 1 week before the evaluation mission	submits to UNDP Country Office
Presentation	Initial Findings	End of evaluation mission	To project management and UNDP Country Office
Draft Report	Full report (**template included in this ToR as Annex 2**)	Within 2 weeks after evaluation mission	Sent to UNDP CO, reviewed by RTS, ICTA
Final Report	Revised report with audit trail detailing how all received comment have (and have not) been addressed in the final evaluation report).	Within 1 week of receiving UNDP comments on draft	Sent to UNDP CO

Key Products Expected from the TE

- Detailed methodology, work plan and outline;
- Terminal Evaluation Report, including Conclusions and Recommendations for a strategy for future replication of the project approach, as well as Lessons Learned;
- Description of best practices, and an "action list" in a certain area of particular importance for the project.

The Draft and Final Report should be prepared in the format as provided as a template **included in this ToR hereto**. **The draft report** will be presented to UNDP/AF not later than **27 June 2017**. **The final report** will be prepared on the basis of the comments to be obtained from the parties related. The deadline for the final report is **27 July 2017**. The report will be presented electronically and in hard copy, in English, and will be translated by the project into Turkmen/Russian languages for distribution to national counterparts.

PAYMENT MODALITY FOR INTERNATIONAL EVALUATOR

%	Milestone
100% of travel costs (including living allowance, ticket cost and any other travel related transfer costs)	Upon arrival in Ashgabat, Turkmenistan
50% of consultation fee	Upon approval of 1st draft terminal evaluation report
50% of consultation fee	Upon approval of final terminal evaluation report

Annex 1: List of Documents

1. Project Document
2. AF Project Performance Reports (PPRs) & AF Tracking Tool
3. Quarterly progress reports and work plans of the various implementation task teams
4. Audit reports
5. The Expert Reports
6. Mid-Term Evaluation Report
7. M & E Operational Guidelines, all monitoring reports prepared by the project; and
8. Financial and Administration guidelines.

The following documents will also be available:

9. Project operational guidelines, manuals and systems
10. Minutes of the Project Board Meetings
11. Maps
12. The AF Operations guidelines; and
13. UNDP Monitoring and Evaluation Frameworks

Other relevant project related documents will be provided upon need and request.

Co-financing table

Sources of Co-financing[44]	Name of Co-financer	Type of Co-financing[45]	Amount Confirmed at CEO endorsement / approval	Actual Amount Materialized at Midterm	Actual Amount Materialized at Closing
		TOTAL			

Explain "Other Sources of Co-financing":

Annex 2: Table of Contents for the Terminal Evaluation Report

i.	**Opening page:** • Title of UNDP supported AF financed project • UNDP and AF project ID#s. • Evaluation time frame and date of evaluation report • Region and countries included in the project • Implementing Partner and other project partners • Evaluation team members • Acknowledgements
ii.	**Executive Summary** • Project Summary Table • Project Description (brief) • Evaluation Rating Table • Summary of conclusions, recommendations and lessons
iii.	**Acronyms and Abbreviations**
1.	**Introduction** • Purpose of the evaluation • Scope & Methodology • Structure of the evaluation report
2.	**Project description and development context** • Project start and duration • Problems that the project sought to address • Immediate and development objectives of the project • Baseline Indicators established • Main stakeholders • Expected Results
3.	**Findings**
3.1	Progress toward Results and impact: • Project Design • Progress • Impact
3.2	Adaptive Management: • Work planning • Finance and co-finance • Monitoring systems • Risk management • Reporting
3.3.	Management Arrangements: • Overall project management • Quality of executive of Implementing Partners • Quality of support provided by UNDP
4	**Sustainability, replication and scaling up**
5	**Conclusions, Recommendations & Lessons** • Corrective actions for the design, implementation, monitoring and evaluation of the project • Actions to follow up or reinforce initial benefits from the project • Proposals for future directions underlining main objectives • Best and worst practices in addressing issues relating to relevance, performance and success • Lessons learned

[44] Sources of Co-financing may include: Bilateral Aid Agency(ies), Foundation, GEF Agency, Local Government, National Government, Civil Society Organization, Other Multi-lateral Agency(ies), Private Sector, Other
[45] Type of Co-financing may include: Grant, Soft Loan, Hard Loan, Guarantee, In-Kind, Other

6 **Annexes**

- ToR
- Itinerary
- List of persons interviewed
- Summary of field visits
- List of documents reviewed
- Questionnaire used and summary of results
- Co-financing table

Annex 3 Project log frame for the programme proposal, including milestones, targets and indicators

Objective: To strengthen water management practices at national and local levels in the context of climate change risks induced water scarcity to farming systems in Turkmenistan				
Outcomes and indicators	**Baseline**	**Targets and Milestones**	**Source of Verification**	**Outputs and indicators**
Outcome 1: institutional capacity to develop climate resilient water policies in agriculture strengthened **Indicator 1.1:** Water code subsidiary laws and regulations that introduce progressive pricing policies and communal management for local water services are in place and operational.	Government has made progressive steps towards improving water management systems. It invests heavily in the improvement and upgrade of water infrastructure and looks out for more advanced technologies. However, water policies remain outdated as well as poorly enforced due to underdeveloped regulations and subsidiary legislation. Tools and methods are missing to identify the most cost-effective adaptation options in the water policies. Water pricing is largely inadequate. The current water policies burden the state budget and do not free resources for service improvement to farmers, especially local small holders. At the same time, farmers involved in large scale productions of water thirsty crop varieties do not receive adequate price signals to use water more efficiently. Given the increasing water shortages and priorities assigned to cash crop production the small holder subsistence farmers bear a disproportionate burden of exacerbating water deficits.	A package of amendments to water code with proposed water tariff and other economic instruments developed and submitted for adoption by end of 2012 Update of the water code to ensure explicit recognition of on climate impacts on water resource availability by end of 2013 At least 2 sets of sub- regulations developed under the Water Code to implement a) progressive and differentiated tariffs, b) support for water delivery services under communal management	Project annual reports; Midterm evaluation, final report; training test results; National law journal	**Output 1.1.** Socio-economic impact of climate change on water availability costed and documented, including cost-benefit analysis of adaptation measures **Indicator 1.1.1:** Study on socio-economic impacts of climate change on water availability, including cost-benefit analysis of adaptation measures conducted; **Indicator 1.1.2:** Number of water legislative acts amended based on climate change cost estimations; **Output 1.2:** A package of modifications in the water code, with particular focus on communal water management; and financial incentives for water efficiency (e.g. differentiated and progressive tariff) developed; **Indicator 1.2.1:** Number of water regulations to introduce progressive and differentiated tariff and water delivery services under communal management
Outcome 2: Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches **Indicator 2. 1:** Number of community based adaptation solutions implemented at the local level upon project closure. **Indicator 2.2:** % of population with improved water management practices resilient to climate change impacts in the targeted regions.	Some of the coping mechanisms employed by farmers, agri-pastoralists and pastoralists in the main agro-ecological systems are increasingly strained due to mounting water deficits. A combination of innovative and traditional measures hasn't been tested to improve water capture, optimize water demand and improve water efficient applications. Over 2,000,000 people live in the target regions with the majority engaged in agriculture, mainly in marginal lands and having very limited access to stable water delivery services.	At least one water harvesting technique and saving measures implemented in Nohur region to benefit 4,000 agri-pastoralists by end of 2014 At least two watering points established in Karakum region to benefit 8,000 farmers and pastoralists by end of 2014 Set of at least three agronomic measures (terracing, intercropping, saksaul planting) implemented in at least 3 communities by end of 2014 Canal level irrigation improvement measures implemented in the Sakar-Chaga region to benefit 20,000 people by end of the project	Project annual reports; Mid-term evaluation, final report; Community surveys;	**Output 2.1:** At least 4,000 agri-pastoralists of the Nohur mountainous region develop and implement water harvesting and saving techniques (such as slope terracing, small rainwater collection dams, contour and stone bunds, planting pits, tillage, mulching) to improve soil moisture levels; **Indicator 2.1.1:** water harvesting and saving techniques demonstrated/tested in targeted Nohur area; **Output 2.2:** At least 8,000 farmers implement community-based well and watering point management measures, including sand fixation and introduction of drought resistant traditional grain varieties in the Karakum desert region; **Indicator 2.2.1:** Community based well and watering point management measures tested and demonstrated in targeted Karakum area **Output 2.3.** At least 20,000 farmers in the Mary Oasis benefit from improved irrigation services through the introduction of canal level, localized management practice; **Indicator 2.3.1:** Canal level management tested and demonstrated

				in targeted Sakar-Chaga area
Outcome 3: Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the three target agro-ecological zones. **Indicator 3.1** Number of associations with improved institutional capacity to deliver water services to target communities. **Indicator 3.2:** % of targeted population with more secure access to water services in the face of climate change where communal management systems adopted.	The State continues to play a far-reaching and predominant role in the economy and acts as the main provider in ensuring adequate living standards of the population, with subsidies, price controls and the free provision of utilities underpinning the system. This has been possible largely due to revenues from the hydrocarbons sector. However, it poses large budgetary burden and results in unsustainable and ineffective water delivery services to farmer and pastoralists communities. Self-functioning and maintained services with the direct engagement of communities are not practiced. Despite existence of water user and farmer associations their role and capacities are limited to improve the water management and delivery options.	At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities by end of 2013 At least 6 community plans on water adaptation have been designed and budgeted through the government's social development programmes by end of the project At least 4 local water adaptation investment projects have been funded through WUA and associated community organizations By end of the project at least 80% of targeted population of approximately 30,000 people has access to improved water services that are resilient to drought and climate aridification At least three lessons learned notes per targeted agro-ecological system, developed and widely disseminated through knowledge networks for further replication by end of project	Project annual reports; Mid-term evaluation, final report; Community Surveys; Social programme budget statements	**Output 3.1:** Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 30,000 farmers and pastoralists **Indicator 3.1.1:** Number of associations with modified mandates strengthening their institutional roles to manage and deliver water services to the target communities **Output 3.2:** Based on VCA assessments, community-based adaptation plans with particular focus on water delivery services designed and implemented through the government's social development programmes with direct engagement of at least 30,000 farmers and pastoralists **Indicator 3.2.1:** Number of community plans has been budgeted through the government's social development programmes **Output 3.3:** At least 4 projects funded up to a total of $400,000 through WUAs and associated community groups **Indicator 3.3.1 :**Number and value of projects through the WUAs **Output 3.4:** Lessons learned on community-based adaptation options under various agro-climatic conditions of Turkmenistan disseminated through ALM and other networks **Indicator 3.4.1:**Number of lessons learned notes formulated **Indicator: 3.4.2:** Number of lessons learned included in the ALM and other knowledge networks

2. Itinerary

Programme of the Visit

Mrs. Lilit Melikyan, International Consultant for terminal evaluation

of the joint UNDP/SCTEPLR/AF project "Addressing Climate Change Risks to farming systems in Turkmenistan at national and community level"

May 25–June 3, 2017

Thursday, May 25, 2017

23:35	Arrival by Lufthansa flight and accommodation in Grand Turkmen Hotel

Friday, May 26, 2017

09.00 – 10.00	Meeting with Project Manager in the AF Project office at NIDFF
10.30 – 11.30	Meeting with UNDP Management (Elena Panova, UNDP Resident Representative in Turkmenistan and Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan)
11.45 – 12.45	Meeting with Rovshen Nurmuhammedov, UNDP Programme Specialist, Environment and Energy Portfolio
13.00 – 14.00	Lunch
14.30 – 15.30	Meeting with Durikov M., National Project Coordinator, Director of NIDFF

Saturday, May 27, 2017

07.00 –08.00	Flight to Mary
08.00 –09:00	Travel to project pilot region Sakarchage
09.30 –13.00	Meetings with local authorities, local project coordinator, community members, project beneficiaries and visiting project sites
13.00 –14.00	Lunch
14.00 –17.30	Meeting with members of WUGs #1, #10, #12, #13 and #15 established in the framework of the project
19.30	Flight to Ashgabat

Sunday, May 28, 2017

	Work at the Hotel

Monday, May 29, 2017

09.30 – 12.30	Meeting with project staff and team of local experts of the project in AF Project office at NIDFF (Aganov S., Kepbanov Y., Veisov S., Gardashev A.)
13.00 – 14.00	Lunch
14.00 – 15.00	Meeting with representatives of the Ministry of Agriculture and Water resources
15.30 – 16.30	Meeting with management of the State Committee of Turkmenistan on Environment Protection and Land resources
17.00 – 18.00	Meeting with representatives of the Mejlis (Parliament)

Tuesday, May 30, 2017

08.00 – 09.00	Traveling to project pilot region Karakum
09.30 – 11.00	Meetings with local authorities, local project coordinator, community members, project beneficiaries and visiting project sites Meeting with members of WUGs “Charwa” and “Tebigat” established in the framework of the project
12.00 – 13.00	Travel to Ashgabat
13.00 – 14.00	Lunch
15.00 – 16.00	Meeting with Farhat Orunov, EU Project: Support to further agriculture and rural development in Turkmenistan – phase III
16.30 – 17.30	Meeting with UNDP Management (Elena Panova, UNDP Resident Representative in Turkmenistan

Wednesday, May 31, 2017

07.00 – 09.30	Traveling to project pilot region Nohur
09.30 – 13.00	Meetings with local authorities, local project coordinator, community members, project beneficiaries and visiting project sites
13.00 – 14.00	Lunch
14.00 – 17.00	Meeting with members of WUG “Cheshme” established in the framework of the project
17.00 – 19.30	Travel to Ashgabat

Thursday, June 01, 2017

09.30 – 10.30	Meeting with representatives of Turkmen Agriculture University named after S.A. Niyazov
11.00 – 12.00	Meeting with representatives of Water Design Institute
13.00 – 14.00	Lunch
15.00 – 16.00	Meeting with GIZ Project on Environment, Maya Ashyrova
16.00 – 17.00	Meeting with GIZ Regional Project on Environment, Venera

Friday, June 02, 2017

09.00 – 10.00	Meeting with AF Project staff in the office at NIDFF
10.00 – 12.00	Preparation of materials for presentation of preliminary findings of the evaluation to UNDP staff
13.00 – 14.00	Lunch
15.00 – 16.00	Presentation of preliminary findings of evaluation mission to UNDP Programme and Project staff
16.00 – 17.00	Meeting with Elena Panova, UNDP Resident Representative in Turkmenistan and Vitalie Vremis, UNDP Deputy Resident Representative in Turkmenistan for debriefing the results of the mission

Saturday, June 03, 2017

03.30	Departure from Ashgabat by Lufthansa flight

3. List of persons interviewed

Type of Institution	Name and position	Affiliation
Government of Turkmenistan	**Dr. Muhammet Durikov** National Project Coordinator	Director of National Institute of Deserts, Flora and Fauna of the State Committee of Turkmenistan on Environment Protection and Land resources
	Kerim Saparov Head of Agrarian Reforms and Global Experience Department	Ministry of Agriculture and Water resources
	Arslan Rejepov Head of International Water Cooperation Department	Ministry of Agriculture and Water resources
	Nazrullayev Ybadulla Head of Projects' department	Water Design Institute of the Ministry of Agriculture and Water resources
	Mergen Yusupov Department for Coordinating of International Programs	State Committee of Turkmenistan on Environment Protection and Land resources
Mejlis of Turkmenistan	**Rejebgeldi Meredow**	Head of the Environmental Protection Committee
Turkmen Agriculture University named after S.A. Niyazov	Hudaykuliev Hatam Deputy Rector of the University.	Turkmen Agriculture University named after S.A. Niyazov
UNDP in Turkmenistan	**Elena Panova** Resident Representative	UNDP in Turkmenistan
	Vitalie Vremis Deputy Resident Representative	UNDP in Turkmenistan
	Rovshen Nurmuhammedov, Programme Specialist, Environment and Energy Portfolio	UNDP in Turkmenistan
	Ogulshirin Yazlyyeva Head of PIU	UNDP in Turkmenistan
	Nazik Avlyakulova Communications Associate	UNDP in Turkmenistan
	Geldi Muradov, Project Manager	UNDP project on "Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan
	Ovezdurdi Jumadurdiev	Water management specialist of the UNDP Project on "Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan" ***former*** Project Coordinator in Sakarchaga of the UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level
UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "	**Rahmanberdi Hanekov** Project Manager	UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "
	Gaygysyz Kurbanseidov Field technical assistant	UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "
	Kakabai Baysakhedov Project Coordinator in Karakum	UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "
	Gurbanmuhammet Abdurakhmanov Project Coordinator in Nohur	UNDP/AF project "Addressing climate change risks to farming systems in Turkmenistan at national and community level "
	Stanislav Aganov	National Expert, UNDP project on "Addressing climate change risks to farming systems in Turkmenistan at national and community level
	Kepbanov Y.,	National Expert, UNDP project on "Addressing climate change risks to farming systems in Turkmenistan at national and community level

Type of Institution	Name and position	Affiliation
	Dr. Sultan Veisov	National Expert, UNDP project on "Addressing climate change risks to farming systems in Turkmenistan at national and community level
	Akmurad Gardashev **Trainer**	UNDP project on "Addressing climate change risks to farming systems in Turkmenistan at national and community level
Development partners	**Martina Dorigo.** Program Analyst	Adaptation Fund
	Farhat Orunov, Agribusiness Consultant	EU project on "Support to further agriculture and rural development in Turkmenistan – SARD III"
	Arthur Russell, Team leader and Rural Development Advisor	EU project on "Support to further agriculture and rural development in Turkmenistan – SARD III
	David Pepper, Agribusiness and Rural Development Specialist	EU project on "Support to further agriculture and rural development in Turkmenistan – SARD III
	Maya Ashyrova, Country Coordinator in Turkmenistan	GIZ Regional Programme on "Sustainable and Climate Sensitive Land Use for Economic Development in Central Asia"
	Venera Shaihulina, Administrative Advisor	GIZ Regional Programme on "Transboundary Water management in Central Asia"
Members of the WUGs	**Members of the WUGs** #1, #10, #12, #13 and #15	WUGs Sakarchaga
	Members of the WUGs "Charwa" and "Tebigat"	WUGs Karakum
	Members of the WUG "Cheshme"	WUS in Nohur
Independent Experts	**Merdan Hudaykuliyev**	Former Project Manager, UNDP project on "Addressing climate change risks to farming systems in Turkmenistan at national and community level

4. List of documents reviewed

General documentation	• UNDP Programme and Operations Policies and Procedures • UNDP Handbook for Monitoring and Evaluating for Results • AF Evaluation Framework • Financial and Administration guidelines. • Project operational guidelines, manuals and systems • AF Operations guidelines
Project documentation	• Project Document, • CDRs • Project Performance Reports • Mid-Term Evaluation Report • Reports of Project Coordinators • Reports of The Project's Training Coordinator • Risk log • Minutes of the Project Board Meetings • Maps • Annual Workplans • Financial audit reports
The Expert Reports	• UNDP Turkmenistan/AF (2016); "Socio-economic assessment of the objectives of adaptation approaches in the context of climate change and increasing water scarcity". Prepared by: Matthew Savage, Haime Echeveria, Stanislav Aganov • Jumadurdiev S. (2015) "The assessment of the activities of WUGs in the pilot regions of Nohur and Karakum" • 3 Manuals produced by Dr Veysov on: Drip Irrigation, Pasture Management, and Sand Dune Fixation • Kepbanov (2016) Legal Basis of the establishment and functioning of Water Users' Association • Antanas Maziliauskas Mission Reports on Advosry work related to modelling • Luciano Rovesti (2016): SURVEY OF JUNIPERUS TURCOMANICA PESTS
Governments papers: policies, laws, strategies, etc.	• NATIONAL CLIMATE CHANGE STRATEGY OF TURMENISTAN (2012) • National Socio-Economic Development Strategy of Turkmenistan to 2030 • Water Code (2016)
3rd party reports: including those of the World Bank, EU, EBRD, GIZ, FAO, independent research centres, etc.	• WB (2014): "Turkmenistan: Diversifying the Turkmen Economy", Report No: ACS12651 • UNECE (2013): "Promoting Green Innovation in Turkmenistan: Policy assessment and recommendations • GIZ (22016): A Source of Cooperation - Transboundary Water • Management in Central Asia. Overview of the Programme's Activities 2009 to 2016 by Dr. Caroline Milow • OECD Green Action Programme (2015):" Financing Climate Action in Turkmenistan • EBRD (2014):" EBRD Strategy for Turkmenistan" • FAO (2015): Turkmenistan and FAO- Partnering for resilient livelihoods and adaptation to climate change • EU "Support for Further Sustainable Agriculture and Rural Development in Turkmenistan" https://www.sard3tm.org/news.php?id=1

5. Adaptation measures as planned and as delivered

Nohur

Proposed Activities from the ProDoc: Develop and test water harvesting techniques, demand side efficiency measures and soil moisture management approaches that can support the livelihoods of 4,000 agro-pastoralists in the local communities. Techniques that will be evaluated and potentially implemented include water harvesting techniques, such as small-scale slope terracing, contour stone and circular bunds, planting pits, living barriers. The rehabilitation of water infiltration dams on small streams will be explored. In terms of water retention and moisture capture perspective, the use of cover crops, mulching, minimum and zero tillage will be explored. To reduce evaporation and prevent loss of moisture, approaches may include use of windbreaks, dry and sparse seeding, fallow techniques, relay cropping and inter-cropping. From a water management perspective, further exploration will be undertaken of drip irrigation systems.

Actual activities: Based on VCA assessment and investment plan for the Nohur pilot region, nearly all planned adaptation measures have been implemented. The implemented measures include the following:

Description of adaptation measures in Nohur	Quantity
Construction of dams	8
Repair of dams and springs	6
Reconstruction and replacement of the water pipe between the spring « Gozbash »* and a reservoir	3 km
Construction of reinforced concrete basins for water storage	3
Drilling of a new wells	2
Reconstruction and repair of the existing drip irrigation system	20 ha
Design and construction of a drip irrigation system	47 ha
Afforestation of the catchment	10 ha
Procurement of construction materials to establish a local nursery and growing seedlings of local species of trees	0.5 ha
The organization of the production of organic-compost and bio-humus	15

Karakum

Proposed Activities from the ProDoc: Develop and test community-based well and watering point management measures, as well as piloting traditional drought resistant grain varieties. It is envisaged that the sub-component will reach up to 8000 farmers from the Yerbent region. The measures envisaged include fixation of sand dunes and water retention through saksaul planting and reed fixation. Focus will be upon scale up of water point availability through the upgrade of existing infrastructure and the development of new well infrastructure where appropriate. It is envisaged that 2 additional well points will have been constructed under the subcomponent by 2014.

Actual activities: Based on VCA assessment and investment plan for the Karakum pilot region, nearly all planned adaptation measures have been implemented. The implemented measures include the following:

Description of adaptation measures in Karakum	Quantity
Construction of a new wells	15
Repair of the existing wells	13
Construction of new sardobs	15
Repair of existing sardobs	4
Cleaning of takyrs and kaks	4
Sand dune fixation and afforestation	10 ha
Procurement of construction materials to establish a local nursery and growing seedlings of local species of trees	0.3 ha

Sakarchaga

Proposed activities from the ProDoc: The Sakar-Chaga sub-component focuses upon the strengthening the role of local associations in delivering irrigation services and introduction of a canal level management. The subcomponent envisages a pilot area of about 700ha of irrigated lands provided with an upgraded infrastructure necessary to implement water-efficient irrigation plans. Local water users will be provided with the capacity to elaborate water efficient management schemes for the use of irrigation water. Lessons gained from decentralized water management planning by leaseholders will be elaborated documented and disseminated as part of the knowledge management strategy.

Actual measures: Based on VCA assessment and investment plan for the Sakarchaga pilot region, nearly all planned adaptation measures have been implemented. The implemented measures include the following:

. Description of adaptation measures in Sakarchaga	Quantity
Construction of water regulating devices	16
Repair of water regulating devices	2
Reconstruction and cleaning of on-farm opened collectors	31,5 km
Construction of the new opened collector	5 km
Rehabilitation of earlier used abandoned lands	50 ha
Land leveling of irrigated lands with application of modern equipment	150 ha
Installation of water pump with transformer	1
Procurement of construction materials for establishment of local nursery and growing seedlings of local species of trees	0.3 ha

6. Several adaptation measures

sardobs

wells

kak

nursery

Water flow regulators

Irrigation pumps

Archa seedlings -

Water reservoir for drip irrigation

Dam

Laser levelling

greenhouse

Saksaul seedlings

on-farm collector

School fencing

water-trough

7. Schedule of trainings

	Title of the training	Dates	Status
	2013		
1	Training "Adaptation to climate change"	Karakum 21.06.13 - 23.06.13 Nohur 05.07.13 - 07.07.13 Sakarchaga 15.07.13 - 17.07.13	**Completed**
	2014		
1	Training "Organizational development and partnership of water users"	04.03.2014- 05.04.2014 Sakarchaga 11.03.2014- 12.04.2014 Karakum 15.03.14 - 16.03.14 Nohur	**Completed**
2	Training on methods of justification of local adaptation projects	23.04.2014- 24.04.2014 Karakum 05.05.14 - 07.05.14 Nohur 14.05.14 - 16.05.14 Sakarchaga	**Completed**
3	Training on development of local projects	Sakarchage 01.08.2014- 02.08.2014 Karakum 05.08.2014- 06.08.2014 Nohur 09.08.2014- 10.08.2014	**Completed**
	2015		
1	Sustainable use of water resources in the Karakum desert	12 June	**Completed**
2	Sustainable water use in Kopetdag mountainous areas	6 -7 June	**Completed**
3	Leveling of irrigated land using laser equipment	11 -12 June	**Completed**
4	Methods of grafting fruit trees	13 - August 14	**Completed**
5	Rational use of mineral fertilizers	18 - 19 August	**Completed**
6	The use of drip irrigation in desert conditions	27 - August 27	**Completed**
7	The use of drip irrigation in the mountains	01 - September 2	**Completed**
8	Rational use of irrigation water at the farm level	07 - 08 September	**Completed**
9	The impact of climate change on desert pastures watering conditions	21 - 22 September	**Completed**
10	The impact of climate change on mountain pastures watering conditions	28 - 29 September	**Completed**
11	Methods of harvesting and water saving in the context of climate change	13 - 14 October	**Completed**
12	Modern methods of improving the yield and productivity of mountain pastures in Turkmenistan	15 - 16 October	**Completed**
13	Methods of harvesting of precipitation water and water saving technics in the context of climate change	October 19 - 20	**Completed**
14	Modern methods of improving the yield and productivity of desert pastures in Turkmenistan	21 - October 22	**Completed**
15	The management of water and land resources, taking into account climate change effects	30 - 31 October	**Planned**
16	Methods to improve soil fertility	02 - 03 November	**Completed**
17	Activities against salinization of irrigated lands	10 - November 11	**Completed**
	2016		
1	Seminar on conducted research on social-economic impact of adaptation measures in Ashgabat	March 2016	**Completed**
2	Working meeting on discussion of developed draft amendments and recommendations to Water Code and other regulatory acts and transfer of these document to government bodies	June 2016	**Completed**
3	TOT on establishing Water users groups and presentation of WUA Manuals developed by MetaMeta research Co.	July 2016	**Completed**
4	Seminar on water saving technologies conducted by Antonas Maziliaskas	October 2016	**Completed**
5	Workshop on reducing salinity levels, improving soil nutrient and using different irrigation technologies conducted by Antonas Maziliaskas at the Turkmen Agricultural University	December 2016	**Completed**
	2017		
1	Organizational development of WUGs in pilot site Sakarchage	30-31 March	**Completed**
2	Organizational development of WUGs in pilot site Karakum	13-14 April	**Completed**
3	Organizational development of WUGs in pilot site Nohur	20-21 April	**Completed**
4	Management and Annual assessment of WUG activity in pilot site Sakarchage	26-27 May	**Completed**
5	Management and Annual assessment of WUG activity in pilot site Karakum	5 - 6 July	**Completed**
6	Management and Annual assessment of WUG activity in pilot site Nohur	20-21 July	**Planned**

8. Description of the relevant current UNDP projects

Name of the project	Description
Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan (2016-2021)	**T**urkmenistan is a water stressed country and has one of the harshest climates in the Central Asian region. Climate change modelling indicates significant increases in temperature and reduction in rainfall. Temperatures are expected to increase by 2^0C by 2040, with precipitation declining across all agro-ecological zones by 8-17 percent between 2040 and 2100, which coupled with increase in temperature, will lead to a decrease in total volume of water availability that is likely to have a profound impact on agricultural production systems and local farmers. The long-term solution envisaged by the Government of Turkmenistan is to mainstream climate change adaptation at the community, district, provincial and national levels in order to secure climate resilient livelihoods in agricultural communities. To help the Government meet these outcomes, the project will support three inter-related components, namely (i) improving climate related socio-economic outcomes in targeted agricultural communities in Lebap and Dashoguz welayats through the implementation of community-based adaptation solutions; (ii) Mainstreaming climate adaptation measures in agricultural and water sector development strategy and policy; and (iii) Strengthening national capacity for iterative climate change adaptation planning, implementation and monitoring in the country. The project will directly strengthen the adaptive capacity and reduce the vulnerability of around 40,000 to 50,000 persons (of which around 51.2% would be women) in the Lebap and Dashoguz welayets by helping them improve the productivity of farm operations, be better prepared for increasing water scarcity and by introducing alternative income sources. Improved water efficiency and crop production systems will bring approximately 20,000 ha of agricultural and 500,000 ha of pastoral lands under climate resilient technologies resulting in a real net household income increase of at least 15% for participating households (including at least 20% of women-headed households). The replication potential of successful efficient water management and climate resilient practices and of new climate-friendly sectoral planning, legislative and capacity development measures would indirectly benefit around 500,000 people in Turkmenistan, of which around 50% would be women).
Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan (2015-2021).	Water management is a defining aspect of the economy and environment in the hot, arid conditions of Turkmenistan. Irrigated agriculture accounts for 90 percent of total water consumption, supplied by aging, energy-intensive infrastructure. About 50 percent of water is lost between withdrawal and ultimate delivery. Water management also plays a direct role as both a cause and a potential remedy for extensive and often severe problems of land degradation in Turkmenistan. Through technology transfer, investment, and policy reform, this project seeks to promote an integrated approach to water management that is energy and water efficient, reduces root causes of land degradation, and enhances local livelihoods and public service delivery. The project objectives are to provide for sufficient and environmentally sustainable water supply to support and enhance social conditions and economic livelihood of the population of Turkmenistan; reduce GHG emissions associated with water management; prevent and remediate salinization of lands. The project will address the problems of water management, energy consumption, land degradation (salinization), and agricultural productivity through integrated activities, with a goal toward achieving multiple benefits in different areas. Thus, improved water management will lead not only to greater water availability, but also to significant energy savings, avoided GHG emissions, and reduced salinization. Application of new renewable-energy solutions in water management will lead not only to avoided GHG emissions, but also to greater water availability in remote populated areas. This integrated approach will be practically applied and technically proven first at specific sites in the Akhal welayat, then replicated across the country through region-specific planning and outreach, as well as supporting policies and investment at the national level.

9. Evaluation matrix

		UNDP	Government	Beneficiaries	Development partners
1	**Project strategy**				
1.1	How relevant was the project strategy in your view? If not relevant – then why? What should have been included/done differently – if any?	x	x	x	x
1.2	Were the duration and budget realistic? Was the planned budget cost effective?				
1.3	Were the gender aspects addressed appropriately?	x		x	
1.4	Was the project results framework adequate?	x			
2	**Progress Towards Results and Impacts**				
2.1	Were all the planned outputs delivered? If not then why?	x	x	x	
2.2.	Did the project contribute to the planned outcomes?	x	x	x	x
2.3	Did the project contribute to the achievement of its objective	x	x	x	x
2.4	What progress has the project made towards results in terms of contribution to sustainable development benefits, as well as global environmental benefits?				
2.5	Did the project have positive or negative environmental and social outcomes? If yes, what?	x	x	x	x
2.6	Did the project result in increased environmental and social risks? If yes, what are those and how were these managed?	x	x	x	x
2.7	Was the implementation of the project inclusive of the stakeholders? If yes, to what extent?	x	x	x	x
2.8	To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?	x	x	x	x
2.9	Did the project promote/result in closer collaboration between different partners? If yes, how? If not, why?	x	x	x	x
3	**Project Implementation & Adaptive Management**				
3.1	How efficient was the project management?	x	x		
3.2	If there were delays, what was the cause and what were the consequences?	x	x	x	
3.3	Are work-planning processes results-based?	x		x	
3.4	What is the quality of financial management? Were appropriate financial controls put in place, including reporting and planning?	x	x		
3.5	Are the interventions cost effective?	x	x		

		UNDP	Government	Beneficiaries	Development partners
3.6	If there were budget revisions, how appropriate were they?	x	x		
3.7	How efficient and effective was the contribution of the implementing partners?	x	x	x	
3.8	How efficient and effective was UNDP support?	x	x		
3.9	Was the project successfully mainstreamed with other UNDP priorities, including SDGs, poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender?	x	x		
3.10	How appropriate were the tools used for monitoring? Do they provide the necessary information? Do they involve key partners? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? Do they have SMART indicators?	x	x		
3.11	Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?	x	x		
3.12	Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?	x	x	x	x
3.13	Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?	x	x	x	x
3.14	How well the Project Team and partners undertake and fulfil AF reporting requirements (i.e. how have they addressed poorly-rated PPRs, if applicable)				
3.15	Were the adaptive management changes have been reported by the project management and shared with the Project Board? How lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners?				
3.16	How appropriate was the project communication with the stakeholders? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?	x	x	x	
3.17	How appropriate was the project external communication? Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?	x			x
4	**Sustainability, replication and scaling up**				
4.1	Were the risks identified in the Project Document, PPRs, and the ATLAS Risk Management Module the most important? Were the risk ratings applied appropriate and up to date? If not, why?	x	x		
4.2	What are the replication and scaling up potential of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?	x	x	x	x
4.3	What is the sustainability potential of the project	x	x	x	x

		UNDP	Government	Beneficiaries	Development partners
4.4	What is the likelihood of financial and economic resources not being available once the AF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?	x	x	x	x
4.5.	Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public/stakeholder awareness in support of the long-term objectives of the project?	x	x	x	x
4.6	Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? Are the required systems/mechanisms for accountability, transparency, and technical knowledge transfer in place?	x	x	x	x
4.7	Are there any environmental risks that may jeopardize sustenance of project outcomes?	x	x	x	x
5	**Lessons Learned**				
5.1	What are the impacts of projected climate change on rural agricultural and livestock based communities within Turkmenistan who may not have access to large scale water infrastructure?	x	x	x	x
5.2	What are the most effective technologies and management techniques for small scale rural demand management from a cost/benefit analysis, and how do these compare with supply side equivalents? Is it feasible to prioritize measures on a resource and cost efficiency basis? How do these water technologies and management techniques differ in terms of their suitability for different climatic and agricultural profiles within Turkmenistan and where are they best deployed?	x	x	x	x
5.3	What are the most suitable delivery mechanisms for the provision, management and maintenance of sustainable water management systems?	x	x	x	x
5.4	Can fiscal and billing mechanisms for water delivery be expanded to encourage more rational use of water by larger scale users without affecting poorer populations, thereby resulting in a more equitable allocation of water at a regional or river basin level?	x	x	x	x
5.5	How can water and climate change considerations be integrated into agricultural sector and economic development planning, and what tools exist to facilitate this, particularly in relation to sustainability and resilience?	x	x	x	x
5.6	What is the most effective way of scaling up community level best practice from local to national level, and how can knowledge be captured and replicated within national social development mechanisms?	x	x	x	x

10. Project log frame for the programme proposal, including milestones, targets and indicators

Objective: To strengthen water management practices at national and local levels in the context of climate change risks induced water scarcity to farming systems in Turkmenistan					
Outcomes and indicators	**Baseline**	**Targets and Milestones**	**Source of Verification**	**Outputs and indicators**	
Outcome 1: institutional capacity to develop climate resilient water policies in agriculture strengthened	Government has made progressive steps towards improving water management systems. It invests heavily in the improvement and upgrade of water infrastructure and looks out for more advanced technologies. However, water policies remain outdated as well as poorly enforced due to underdeveloped regulations and subsidiary legislation. Tools and methods are missing to identify the most cost-effective adaptation options in the water policies. Water pricing is largely inadequate. The current water policies burden the state budget and do not free resources for service improvement to farmers, especially local small holders. At the same time, farmers involved in large scale productions of water thirsty crop varieties do not receive adequate price signals to use water more efficiently. Given the increasing water shortages and priorities assigned to cash crop production the small holder subsistence farmers bear a disproportionate burden of exacerbating water deficits.	A package of amendments to water code with proposed water tariff and other economic instruments developed and submitted for adoption by end of 2012 Update of the water code to ensure explicit recognition of on climate impacts on water resource availability by end of 2013 At least 2 sets of sub- regulations developed under the Water Code to implement a) progressive and differentiated tariffs, b) support for water delivery services under communal management	Project annual reports; Midterm evaluation, final report; training test results; National law journal	**Output 1.1.** Socio-economic impact of climate change on water availability costed and documented, including cost-benefit analysis of adaptation measures **Output 1.2:** A package of modifications in the water code, with particular focus on communal water management; and financial incentives for water efficiency (e.g. differentiated and progressive tariff) developed;	**Indicator 1.1:** Water code subsidiary laws and regulations that introduce progressive pricing policies and communal management for local water services are in place and operational. **Indicator 1.1.1:** Study on socio-economic impacts of climate change on water availability, including cost-benefit analysis of adaptation measures conducted; **Indicator 1.1.2:** Number of water legislative acts amended based on climate change cost estimations; **Indicator 1.2.1:** Number of water regulations to introduce progressive and differentiated tariff and water delivery services under communal management

Objective: To strengthen water management practices at national and local levels in the context of climate change risks induced water scarcity to farming systems in Turkmenistan					
Outcomes and indicators	**Baseline**	**Targets and Milestones**	**Source of Verification**	**Outputs and indicators**	
Outcome 2: Resilience to climate change enhanced in targeted communities through the introduction of community-based adaptation approaches	Some of the coping mechanisms employed by farmers, agree-pastoralists and pastoralists in the main agro-ecological systems are increasingly strained due to mounting water deficits. A combination of innovative and traditional measures hasn't been tested to improve water capture, optimize water demand and improve water efficient applications. Over 2,000,000 people live in the target regions with the majority engaged in agriculture, mainly in marginal lands and having very limited access to stable water delivery services.	At least one water harvesting technique and saving measures implemented in Nohur region to benefit 4,000 agri-pastoralists by end of 2014 At least two watering points established in Karakum region to benefit 8,000 farmers and pastoralists by end of 2014 Set of at least three agronomic measures (terracing, intercropping, saksaul planting) implemented in at least 3 communities by end of 2014 Canal level irrigation improvement measures implemented in the Sakar-Chaga region to benefit 20,000 people by end of the project	Project annual reports; Mid-term evaluation, final report; Community surveys;	**Output 2.1:** At least 4,000 agri-pastoralists of the Nohur mountainous region develop and implement water harvesting and saving techniques (such as slope terracing, small rainwater collection dams, contour and stone bunds, planting pits, tillage, mulching) to improve soil moisture levels; **Output 2.2:** At least 8,000 farmers implement community-based well and watering point management measures, including sand fixation and introduction of drought resistant traditional grain varieties in the Karakum desert region; **Output 2.3.** At least 20,000 farmers in the Mary Oasis benefit from improved irrigation services through the introduction of canal level, localized management practice;	**Indicator 2. 1:** Number of community based adaptation solutions implemented at the local level upon project closure. **Indicator 2.2:** % of population with improved water management practices resilient to climate change impacts in the targeted regions. **Indicator 2.1.1:** water harvesting and saving techniques demonstrated/tested in targeted Nohur area; **Indicator 2.2.1:** Community based well and watering point management measures tested and demonstrated in targeted Karakum area **Indicator 2.3.1:** Canal level management tested and demonstrated in targeted Sakar-Chaga area
Outcome 3: Community-managed water delivery services introduced to benefit over 30,000 farmer and pastoralist communities in the	The State continues to play a far-reaching and predominant role in the economy and acts as the main provider in ensuring adequate living standards of the population, with subsidies, price controls and the free provision of utilities underpinning the system. This has	At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities by end of 2013 At least 6 community plans on water adaptation have been	Project annual reports; Mid-term evaluation, final report; Community Surveys; Social programme budget statements	**Output 3.1:** Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 30,000 farmers	**Indicator 3.1** Number of associations with improved institutional capacity to deliver water services to target communities. **Indicator 3.2:** % of targeted population with more secure access to water services in the face of climate change where communal

Objective: To strengthen water management practices at national and local levels in the context of climate change risks induced water scarcity to farming systems in Turkmenistan					
Outcomes and indicators	**Baseline**	**Targets and Milestones**	**Source of Verification**	**Outputs and indicators**	
three target agro-ecological zones.	been possible largely due to revenues from the hydrocarbons sector. However, it poses large budgetary burden and results in unsustainable and ineffective water delivery services to farmer and pastoralists communities. Self-functioning and maintained services with the direct engagement of communities are not practiced. Despite existence of water user and farmer associations their role and capacities are limited to improve the water management and delivery options.	designed and budgeted through the government's social development programmes by end of the project At least 4 local water adaptation investment projects have been funded through WUA and associated community organizations By end of the project at least 80% of targeted population of approximately 30,000 people has access to improved water services that are resilient to drought and climate aridification At least three lessons learned notes per targeted agro-ecological system, developed and widely disseminated through knowledge networks for further replication by end of project		and pastoralists **Output 3.2:** Based on VCA assessments, community-based adaptation plans with particular focus on water delivery services designed and implemented through the government's social development programmes with direct engagement of at least 30,000 farmers and pastoralists **Output 3.3:** At least 4 projects funded up to a total of $400,000 through WUAs and associated community groups **Output 3.4:** Lessons learned on community-based adaptation options under various agro-climatic conditions of Turkmenistan disseminated through ALM and other networks	management systems adopted. **Indicator 3.1.1:** Number of associations with modified mandates strengthening their institutional roles to manage and deliver water services to the target communities **Indicator 3.2.1:** Number of community plans has been budgeted through the government's social development programmes **Indicator 3.3.1:** Number and value of projects through the WUAs **Indicator 3.4.1:** Number of lessons learned notes formulated **Indicator: 3.4.2:** Number of lessons learned included in the ALM and other knowledge networks

11. Turkmenistan AF Project Contributions to Adaptation Fund Strategic Results

Project Component	AF Outcome / Output	AF Outcome / Output Indicators	Turkmenistan AF Project Baseline	Turkmenistan AF Project Target
Component 1	**Outcome 7: Improved policies and regulations that promote and enforce resilience measures**	**7. Climate change priorities are integrated into national development strategy**	**Scale 1-5:** Baseline = 2: Most not integrated in Water code of Turkmenistan, (2004). The National Strategy on Climate Change was adopted. There are sections on the use of adaptive techniques in agriculture. Government has made progressive steps towards improving water management systems. It invests heavily in the improvement and upgrade of water infrastructure and looks out for more advanced technologies. However, water policies remain outdated as well as poorly enforced due to underdeveloped regulations and subsidiary legislation. Tools and methods are missing to identify the most cost-effective adaptation options in the water policies. Water pricing is largely inadequate. The current water policies burden the state budget and do not free resources for service improvement to farmers, especially local small holders. At the same time, farmers involved in large scale productions of water thirsty crop varieties do not receive adequate price signals to use water more efficiently. Given the increasing water shortages and priorities assigned to cash crop production the small holder subsistence farmers bear a	**Scale 1-5:** **Target = 3:** **A package of amendments to water code with proposed water tariff and other economic instruments was developed and mostly included in the new Water Code adopted in 2016 (with significant contribution from the project** **So, the target "3"** is met. It would have been 4, if the other parts of legislation drafted with the project's help was adopted (draft Law on WUA, Regulation on tariffs, changes to the Law on Daikhan Associations", etc.)

Project Component	AF Outcome / Output	AF Outcome / Output Indicators	Turkmenistan AF Project Baseline	Turkmenistan AF Project Target
			disproportionate burden of exacerbating water deficits.	
Component 2	**Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level**	**2.1. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks**	**Scale 1-5:** **Baseline = 1: Aware of neither predicted adverse impacts of climate change nor of appropriate responses. Some of the coping mechanisms employed by farmers, agri-pastoralists and pastoralists in the main agro-ecological systems are increasingly strained due to mounting water deficits. A combination of innovative and traditional measures hasn't been tested to improve water capture, optimize water demand and improve water efficient applications. Over 2,000,000 people live in the target regions with the majority engaged in agriculture, mainly in marginal lands and having very limited access to stable water delivery services.**	**Scale 1-5:** Target = 4: Mostly aware At least 70% of agri-pastoralists and farmers of the Nohur mountainous region trained, develop and implement water harvesting and saving techniques. At least one water harvesting technique and saving measures implemented in Nohur region to benefit 70% agri-pastoralists At least 50% of farmers implement community-based well and watering point management measures, including sand fixation. At least two watering points established for at least 50%. Set of at least three agronomic measures implemented in at least 3 communities At least 50% farmers in Sakarchaga area to benefit from improved irrigation services through the introduction of canal level, localized management practice. **Results:** target achieved, as the number of project beneficiaries both in terms of using the adaptation measures and getting training, as well as participating in the awareness workshops, exceeded the plans
Component 3	**Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses**	**2.1. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks**	*Indicator Unit: Qualitative and Quantitative measures of capacity within targeted institutions.* **Baseline: The State continues to play a far-reaching and predominant role in the economy and acts as the main provider in ensuring adequate living standards of the population, with**	*Indicator Unit: Qualitative and Quantitative measures of capacity within targeted institutions.* Target: WUAs established/strengthened in local communities in three pilot regions. Mandates and institutional functions of local associations strengthened to improve local water services that are more resilient to increasing water stress and benefit at least 40% farmers and pastoralists.

Project Component	AF Outcome / Output	AF Outcome / Output Indicators	Turkmenistan AF Project Baseline	Turkmenistan AF Project Target
			subsidies, price controls and the free provision of utilities underpinning the system. This has been possible largely due to revenues from the hydrocarbons sector. However, it poses large budgetary burden and results in unsustainable and ineffective water delivery services to farmer and pastoralists communities. Self-functioning and maintained services with the direct engagement of communities are not practiced. Despite existence of water user and farmer associations their role and capacities are limited to improve the water management and delivery options.	At least 6 associations have clear mandates, institutional capacities and skills to manage and deliver water services to the target communities by end of 2013 At least 6 community plans on water adaptation have been designed and budgeted through the government's social development programmes by end of the project At least 4 local water adaptation investment projects have been funded through WUA and associated community organizations By end of the project at least 80% of targeted population of approximately 50% has access to improved water services that are resilient to drought and climate aridification. At least three lessons learned notes per targeted agro-ecological system, developed and widely disseminated through knowledge networks for further replication by end of project **Results:** achieved, with one qualified that these are not WUAs but WUGs. 4 local water adaptation investment projects have been funded through WUA and associated community organizations The targets in terms of share of local population with improved water services was reached. The number of direct beneficiaries (over 35420) exceeds the planned number of 32000. It is also estimated in there that the total population benefitting from the implementation of this project amounts to 69,421 persons, i.e. the initial target of 62000 people has been thus exceeded by 12 percent

[i] The project document includes a detailed M&E budget, but M&E is not included as a stand-alone budget line in project budgets. According to the project document: "The M&E budget will be taken pro-rata from the three projects component budgets, reflecting the size of the TA".
[ii] Disbursements for 2017 is not final, this is projected figures until end of the project.